

Final
**Recommended Record of Decision
of the District Commander**

On Permit Application Number 93-0902-12
Submitted by the City of Newport News
on Behalf of the Regional Raw Water Study Group

For the King William Reservoir Project
on Cohoke Creek in King William County, Virginia



**US Army Corps
of Engineers®**

Norfolk District
803 Front Street
Norfolk, Virginia 23510-1096

2 July 2001

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PREFACE

The District's Recommended Record of Decision (RROD) was published on 20 March 2001 with a 45-day comment period that ended on 4 May 2001. This Final document (Final RROD) addresses comments and information received during the comment period from the Corps' federal advisory agencies; other federal and state agencies and representatives; local government officials; City of Newport News officials, employees and consultants; environmental groups active in the Chesapeake Bay region; and the general public.

With the exception of corrections for spelling, punctuation and grammatical errors, all new text appears in red type. Changes to the body of the text were made where necessary, otherwise these comments are addressed by subject at the end of the appropriate sections of the document and in the comment sections 17, 18, 19 and 20.

As the Norfolk District is recommending denial of the Department of the Army permit application, this document, along with the District's administrative record on the Regional Raw Water Study Group's application, will be forwarded to the Commander of the North Atlantic Division for a final decision.



DEPARTMENT OF THE ARMY
NORFOLK DISTRICT, CORPS OF ENGINEERS
FORT NORFOLK, 803 FRONT STREET
NORFOLK, VIRGINIA 23510-1096

REPLY TO
ATTENTION OF

CENAO-TS-G

2 July 2001

MEMORANDUM FOR Commander, North Atlantic Division, ATTN: CENAD-CO-R

SUBJECT: Recommended Record of Decision of the District Commander on Permit Application 93-0902-12 submitted by the City of Newport News on behalf of the Regional Raw Water Study Group to construct the King William Reservoir Project on Cohoke Creek in King William County, Virginia.

1. Name of Applicant: The City of Newport News, acting on behalf of a group of municipalities known as the Regional Raw Water Study Group (RRWSG), c/o Mr. R. W. Hildebrandt, Assistant City Manager, 2400 Washington Avenue, Newport News, Virginia 23607. The terms RRWSG, the City of Newport News, Newport News Waterworks, the project proponent, and the applicant are all used in this document. These terms are generally interchangeable, but in some cases it was difficult to determine if submittals by the City of Newport News or Newport News Waterworks were made on their own or on behalf of the RRWSG.

2. Location, Description and Purpose of the Proposed Activity:

a. Location: The proposed King William Reservoir would be located in Cohoke Creek (also known as Cohoke Mill Creek), a tributary to the Pamunkey River, in King William County, Virginia. Cohoke Creek lies in a deeply incised valley between the Mattaponi and Pamunkey Rivers, which join at West Point, Virginia to form the York River. The reservoir would be generally located between State Route 30 to the north, County Route 630 to the east, County Route 626 to the south and County Route 633 to the west, in a rural area known locally as Pamunkey Neck. The proposed raw water intake and pumping station would be located at Scotland Landing, in the freshwater tidal portion of the Mattaponi River, a tributary to the York River in King William County, Virginia (see Map 1 - Project Vicinity Map).

b. Description: The proposal involves the withdrawal of water from the Mattaponi River, pumpover to a reservoir created by impounding the upper half of Cohoke Creek, and the transmission of the water by underground pipeline to the Newport News Waterworks' existing water supply system. The project consists of the following activities requiring Department of the Army authorization:

(1) Impoundment: A 78-foot high by 1,700-foot long earthen dam would be constructed on Cohoke Creek, approximately 3.5 miles upstream of the existing Cohoke Mill Pond dam and 0.2 miles downstream of the Route 626 crossing of Cohoke Creek to provide a raw water storage reservoir. The reservoir would impound a surface area of approximately 1,526 acres at a normal water surface elevation of 96 feet at mean sea level to provide a storage volume of approximately 12.2 billion gallons. The reservoir pool area would be clearcut logged up to elevation 90 feet at mean sea level. Approximately 100,000 cubic yards of material would be excavated from vegetated wetlands in order to remove unsuitable organic soils for the preparation of the dam footprint. The downstream toe of the dam and the

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spillway discharge channel would be protected by riprap. The existing Cohoke Creek crossing of County Route 626 would be relocated to the top of the dam structure. The impoundment would involve the excavation, filling and displacement by flooding of 437 acres of waters of the United States consisting of 403 acres of palustrine forested, scrub-shrub and emergent wetlands and 34 acres of shallow open water. The construction of the impoundment would also inundate approximately 21 miles of free-flowing perennial and intermittent streams.

(2) Pipeline: A 50 million gallon per day (mgd) reservoir pump station would be constructed on the downstream side of the dam to pump raw water from the King William Reservoir through an estimated 11.7 miles of 42-inch and 48-inch diameter pipeline to Beaverdam Creek, a tributary to the Newport News Waterworks' existing Diascund Creek Reservoir in New Kent County. The construction of the pipeline would involve crossings of the Pamunkey River, Cohoke Creek near its confluence with the Pamunkey River, and 60 other perennial and/or intermittent streams and wetland areas. The 4,500-foot long submarine pipeline crossing of the Pamunkey River and adjacent wetlands would be accomplished by directional drilling methods to avoid disturbance of the river bottom and wetlands. A concrete emergency drain outfall structure and riprap slope protection apron would be constructed on the west bank of the Pamunkey River. Other pipeline crossings would be excavated and backfilled to pre-existing grades. The total area that would be impacted by the pipeline construction would be 113 acres including approximately 10.4 acres of wetlands/streams. Most of the affected stream and wetland areas are palustrine forested, broad-leaved deciduous wetlands. Construction and maintenance of the pipeline right-of-way would permanently convert forested wetlands to emergent and scrub-shrub wetlands.

(3) Outfall Structure: The pipeline would end at a pre-cast concrete outfall structure with a 30-foot long riprap apron on Beaverdam Creek approximately 0.3 miles west of the Interstate 64 Bridge over Beaverdam Creek and 0.8 miles upstream of the normal pool area of Diascund Creek Reservoir. A 150-foot long discharge channel would be excavated to connect the outfall to the main channel of Beaverdam Creek. The outfall would be designed for a maximum discharge flow of 50 mgd. Approximately 0.15 acres of vegetated wetlands consisting of a mixture of palustrine forested, scrub-shrub, emergent and sub-emergent communities would be impacted by the outfall structure and the excavated channel. The existing Newport News Waterworks raw water transmission system would transport the raw water from the Diascund Creek Reservoir to terminal reservoirs and treatment plants.

(4) Intake Structure: Because the reservoir drainage area is so small (8.9 square miles), the project would also involve the construction of a raw water intake and pumping station with a withdrawal capacity of 75 million gallons per day (mgd) at Scotland Landing on the southern shore of the Mattaponi River approximately 24.2 river miles upstream of its mouth, and the construction of 1.5 miles of 54-inch, 75 mgd capacity transmission pipeline with an outfall at the upper end of the proposed reservoir. Approximately 6,000 cubic yards of material would be excavated from the river bottom to facilitate the installation of the intake structure and concrete foundation. The intake pipe will be encased in a concrete structure and backfilled with gravel and riprap. River withdrawals would be accomplished through twelve, 7-foot diameter wedge-wire intake screens arranged atop the foundation in a single row parallel to the shoreline approximately 140 feet channelward of mean high water. The screens would be designed with one-millimeter slot openings and a maximum through slot velocity of 0.25 feet per second to protect fish eggs and larvae from entrainment and impingement. Two 60-inch diameter intake lines would be installed using a microtunneling method, which would not disturb the shoreline or bank. No wetlands would be impacted by the footprint of the proposed pumping station.

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Initial withdrawals of up to 75 million gallons of water per day (mgd) would be pumped from the Mattaponi River to the King William Reservoir for the purpose of filling the reservoir and would continue whenever the reservoir level drops below the normal pool elevation of 96 feet at mean sea level. However, river withdrawals would be restricted by a minimum instream flow requirement (MIF) to prohibit pumping during periods of low freshwater flow in the river. The applicant's proposed 40/20 MIF applies the 40 Tennant MIF during the higher flow months of December through May and the 20 Tennant MIF during the lower flow months of June through November.

(5) Pier and Boathouse: A 72-foot long pier with an enclosed boathouse would be constructed adjacent to the intake structure on the Mattaponi River to provide mooring and storage of a boat for use in water quality sampling and intake screen maintenance.

(6) Applicant's Proposed Compensation Plan: To compensate for the loss of wetlands within the dam and reservoir pool area, the RRWSG propose to establish replacement wetlands at a 2 to 1 ratio in several sites throughout the York River and Rappahannock River watersheds. The applicant has also proposed a stream restoration plan in Louisa County. The applicant's Mitigation Program, Fish and Wildlife Mitigation Plan also outlines other potential mitigation measures. The applicant's proposed mitigation plans are discussed in detail in Section 8 f of this document.

c. Purpose: The applicant's stated purpose is "To provide a dependable, long-term public water supply for the Lower Virginia Peninsula, in a manner which is not contrary to the overall public interest." The Regional Raw Water Study Group has stated that a new raw water supply which can increase the regional treated water delivery capacity by 39.8 mgd is required to satisfy projected demands through the year 2040 (changed by applicant in November 2000 to year 2050). In order to meet the projected need, Newport News Waterworks has proposed the King William Reservoir as their preferred alternative to supply 23.2 mgd of the projected treated water safe yield deficit. The RRWSG estimates that construction and filling of the reservoir would take about ten years. Fresh groundwater development (4.4 mgd), brackish groundwater desalination (5.7 mgd) and conservation measures/use restrictions (7.1 to 11.1 mgd) are the other three components of the applicant's proposed water supply plan.

The RRWSG is led and principally funded by the City of Newport News and its current members consist of the City of Newport News, the City of Williamsburg and York County. The Lower Virginia Peninsula jurisdictions to be served by the Regional Raw Water Study Group include the Cities of Newport News, Hampton and Poquoson, which compose the current Newport News Waterworks service area, the City of Williamsburg, and York and James City Counties. Although once a member of the RRWSG, James City County is currently a participant under the conditions of a Memorandum of Agreement with the City of Newport News. Within the RRWSG service area are four military installations. Fort Eustis, located in Newport News and the Yorktown Naval Weapons Station, located in York County, rely on Newport News Waterworks for all of their water supplies. Langley Air Force Base and Fort Monroe, both located in Hampton, obtain their water supplies from Fort Monroe's Big Bethel Reservoir, but rely on Newport News Waterworks for emergency supplies. The applicant's projected 39.8 mgd deficit is broken down as follows: Newport News Waterworks service area = 32.8 mgd, Williamsburg = 1.5 mgd, York County = 1.1 mgd and James City County = 4.4 mgd (see Map 2 - Regional Map).

The City of Newport News Waterworks would receive 82% of the safe yield. Seven mgd or 18% of the safe yield would be supplied to the other members. While not members of the Regional Raw Water Study Group or a part of the RRWSG service area, King William County and New Kent County are host

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communities for the reservoir and pipeline, respectively. If the King William Reservoir were built, the host agreements with these localities provide a 3 mgd allowance of raw water for King William County and a 1 mgd allowance of raw water for New Kent County in the reservoir storage volume, should these localities ever choose to purchase the water from the City of Newport News and to construct the pipes, pump stations, treatment plants and distribution systems necessary to obtain the water. The water supplies and needs of the host localities have not been included in the RRWSG's calculations of the 39.8 mgd deficit for the region (see Map 3 - RRWSG Service Area and Host Communities).

On 27 October 2000, the City of Newport News reported a re-calculated 19 to 21 mgd safe yield benefit from the King William Reservoir based on the conditions contained in the Virginia Water Protection Permit. On 30 November 2000, the City of Newport News submitted an updated water needs assessment, which reported that the Peninsula's 2050 deficit could be as low as 15 mgd or as high as 36 mgd, depending on the rate of regional population growth and economic development. The report indicated a 50 percent chance that the regional need for additional water supply in 2050 would be between 22 and 27 mgd.

Based on my review of the applicant's stated project purpose, I am defining the overall project purpose as follows: to satisfy the water supply needs of the localities in the Regional Raw Water Study Group service area through the year 2050.

3. Applicable Statutory Authorities and Administrative Determinations Conferring Corps of Engineers Regulatory Jurisdiction: Section 10 of the Rivers and Harbors Act of 3 March 1899 (30 Stat. 1151, 33 U.S.C. 403) and Section 404 of the Federal Water Pollution Control Act, as amended (Clean Water Act,) (Public Law 92-500, 86 Stat 816 and 33 U.S. C. 1344) are applicable.

4. Other Federal, State and Local Authorizations Obtained or Required and Pending:

a. Other Federal Authorizations: No other federal authorizations are required.

b. State Authorizations:

(1) Section 401 of the Clean Water Act (33 U. S. C. 1341): The issuance or waiver of a state certification assuring that the proposed discharge will not violate specified water quality standards is required prior to the issuance of the Corps of Engineers permit under Section 404 of the Act. In Virginia, the State Water Control Board (SWCB) and the Virginia Department of Environmental Quality-Water Division (DEQ) implement Section 401 under the 1989 Water Protection Permit law (Va. Code 62.1-44.15:5).

The Virginia DEQ issued its Virginia Water Protection Permit (VWPP)/401 Certificate Number 93-0902 on 22 December 1997 with an expiration date of 22 December 2007. The permit imposed a more restrictive minimum instream flow for the Mattaponi River than the one the RRWSG proposed, set a higher minimum downstream release from the dam into Cohoke Creek and placed maximum limits on interbasin transfers from the King William Reservoir to the other Newport News reservoirs, all of which the City of Newport News claimed restricted the safe yield of the project to the point that it would not provide enough water to justify its construction. The City of Newport News immediately filed suit in Newport News Circuit Court against DEQ and the State Water Control Board to have these restrictions removed. A ruling by the Newport News Circuit Court upheld the DEQ permit conditions and the City of

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Newport News did not appeal the decision, but stated that they would pursue changes to the permit when it is eligible for re-issuance in 10 years.

The Mattaponi Tribe also filed suit against the DEQ and the SWCB alleging that the Board issued its permit without considering the detrimental impact the project would have on the survival of the Tribe. In addition, King and Queen County and several environmental groups filed suit against the Board for issuing its permit. However, the court ruled that these groups lacked the legal standing to sue the Board on its decision.

In accordance with comments received from the Institute for Public Representation, representing the Mattaponi Tribe, and the Southern Environmental Law Center, the following additional information to reflect the recent Virginia Supreme Court decision is included in the final RROD: The Mattaponi Tribe and the environmental groups filed separate law suits against the Board alleging violations of various state and federal laws and regulations, as well as the 1677 Treaty at Middle Plantation. The Newport News Circuit Court originally ruled that the Tribe and the other groups lacked legal standing to sue the Board on its decision. However, on 2 March 2001, the Virginia Supreme Court decided that these parties did have standing to bring their claims in court, and reversed and remanded the case for full trial on the merits by the lower court. (*Mattaponi Indian Tribe and Alliance to Save the Mattaponi et al. v. Commonwealth of Virginia, et al.*, 2 March 2001.) Therefore, the Virginia courts have not yet resolved these challenges to the VWPP/401 Certificate.

(2) Virginia Wetlands Act (Va. Code 28.2-1300): Either the Virginia Marine Resources Commission (VMRC) or the local Wetlands Board must grant a permit for construction in any state-owned submerged land in the Commonwealth of Virginia or any tidal wetland area in “Tidewater Virginia” (generally east of Interstate 95). This includes the intake and associated structures, pipeline crossings and discharge structures. VMRC is reviewing the permit application. As the local governments are co-applicants, local wetlands board approval may not be required. The dam for the proposed reservoir is authorized by statute pursuant to Section 28.2-1203 of the Code of Virginia and would not require a permit from the VMRC.

(3) Virginia Dam Safety Act (Va. Code 10.1-604): The Virginia Soil and Water Conservation Board (under the Virginia Department of Conservation and Recreation) must issue construction permits to provide for design, construction, operation, and maintenance of impounding structures to protect public safety.

(4) Coastal Zone Management Act of 1972: The project must be constructed and operated in a manner that is consistent with the Virginia Coastal Resource Management Program. The City of Newport News has written to the Virginia Coastal Program Manager stating that the project is consistent with the Act. However, the state has requested more information in order to determine if they concur with the applicant's draft federal consistency certification.

(5) Federal Safe Drinking Water Act: The Virginia Department of Health must approve the capacity of waterworks operation systems (Va. Code 32.1-172).

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c. Local Authorizations:

(1) Virginia Erosion and Sediment Control Law (Va. Code 10.1-560): The law specifies minimum standards for control of soil erosion, sediment deposition, and non-agricultural runoff. Localities must adopt a plan that is consistent with the state program. The applicant is required to submit a sediment and erosion control plan for approval by the counties in which work is conducted.

(2) Chesapeake Bay Preservation Act (Va. Code 10.1-2100): Localities in eastern Virginia are required to implement land use controls to improve the condition of Chesapeake Bay waters and to designate Chesapeake Bay Preservation Areas in which all project activities would be required to comply with the appropriate land use controls. The Act is administered by the Chesapeake Bay Local Assistance Department. The 1997 King William County Comprehensive Plan shows the proposed reservoir and designates a 100-foot wide area around the reservoir pool area as a Resource Protection Area. The remainder of the County is designated as a Resource Management Area. Specific authorizations for the reservoir have not yet been sought.

(3) Local Zoning: The reservoir site is currently zoned as Agricultural/Conservation. Approvals from King William and New Kent Counties under state and local consent statutes and local zoning ordinances would be required for some components of the project. The counties have provided local consent for the project.

5. Public Notices, Public Hearing and Publication of Environmental Impact Statement (EIS) and District's Recommended Record of Decision: A total of 395 days of public comment period has been provided on the King William Reservoir project.

a. Notice of Intent to Prepare Draft EIS: Because of the range of alternatives and the potential for significant environmental impacts, the District determined that an Environmental Impact Statement would be required. A notice of intent to prepare a Draft EIS on the City's proposed raw water supply was published in the Federal Register on 30 July 1990.

b. Scope of Study for Draft EIS: A public scoping meeting was not conducted because the project alternatives were so geographically widespread. Rather, a Public Notice was issued on 1 August 1990 requesting public comments by 20 August 1990 on the Scope of Study for the development of an EIS on the regional water supply to meet the future short and long-term needs of the Regional Raw Water Study Group. The notice listed a reservoir on Cohoke Creek with a pumpover from the Mattaponi River as one of numerous alternatives that would be considered and indicated that an Environmental Impact Statement would be required to evaluate the environmental impacts, project alternatives and other public interest review factors

c. Draft EIS and Public Notice: In accordance with the requirements of the National Environmental Policy Act (NEPA) of 1969, as amended, a Draft Environmental Impact Statement for the proposed water supply project was released for public review and comment on 4 February 1994 with a 45-day comment period to end on 21 March 1994.

d. Public Hearing: In the District's Public Notice announcing the availability of the Draft EIS, it was also announced that a public hearing for this proposal had been scheduled for 7:30 PM on 8 March 1994 in the auditorium of the Acquinton Elementary School which is located near the intersection of

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Routes 30 and 629 in King William County, Virginia. The hearing record remained open for ten days after the public hearing for the submittal of written comments. The District determined that a 30-day extension of the Draft EIS comment period until 20 April 1994 was warranted to allow for thorough public review of the document.

e. Public Notice: Based on comments received at the District's Public Hearing and in response to the Draft EIS, the District announced in a Public Notice dated 8 June 1994 the intent to prepare a Supplement to the Draft EIS to remedy the inadequacies of the document, address concerns raised during the public review and include the results of additional field studies.

f. Supplement to the Draft EIS and Public Notice: The Norfolk District announced the availability of the Supplement to the Draft Environmental Impact Statement (Supplement) for the project on 29 December 1995 with a 45-day comment period to end on 12 February 1996. However, official Notice of Availability of the document was not announced in the 29 December 1995 Federal Register due to the partial federal furlough from 18 December 1995 to 12 January 1996. The Notice of Availability appeared in the 26 January 1996 Federal Register with the original closing of the comment period on 12 February 1996. Although the Supplement was mailed on time, the District determined that a 30-day extension of the comment period until 13 March 1996 was warranted to allow for thorough agency and public review of the document.

g. Final EIS and Joint Federal/State Public Notice: The Norfolk District announced availability of the Final Environmental Impact Statement (Final EIS or FEIS) for the project on 24 January 1997 with a 30-day comment period to end on 24 February 1997. The Public Notice also announced the receipt of the RRWSG's permit application. In a Public Notice dated 3 February 1997, the comment period was extended by 30 days to end on 26 March 1997. In a subsequent Public Notice dated 11 March 1997, the comment period was further extended by 60 days to end on 26 May 1997. Finally, in a Public Notice dated 9 May 1997, the comment period was extended an additional 60 days to end on 25 July 1997. The comment period for the Final EIS totaled 180 consecutive days.

Copies of all EIS documents were made available for viewing during normal business hours at the Army Corps of Engineers Norfolk District Office; the Offices of the City Managers in the Cities of Hampton, Newport News, Poquoson, and Williamsburg; the Offices of the County Administrators in the Counties of James City, King and Queen, King William, New Kent, and York; as well as at the following libraries: Hampton Public Library, Heritage Library, King and Queen Branch Library, Newport News Public Library, Pamunkey Regional Library, Poquoson Public Library, Williamsburg Regional Library, and York County Public Library. Single copies of the EIS documents were made available upon request and at no charge for as long as they lasted. Individuals who subsequently requested copies were referred to the local libraries.

h. Publication of the Norfolk District's Recommended Record of Decision: The District's Recommended Record of Decision was published on 20 March 2001. A complete electronic version was made available to the public on the District's Web page. A 10-page Public Notice announcing the availability of the 212-page Recommended Record of Decision and the 45-day comment period was posted on the Norfolk District's Web site and a printed copy of the Public Notice was mailed to all names on the District's mailing list for the project. The Public Notice included the Conclusions and Recommendation of the Recommended Record of Decision as they appeared at the end of the document. A printed copy of the District's Recommended Record of Decision was made available for viewing

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during normal business hours at the Army Corps of Engineers Norfolk District Library as well as at the following libraries: Charles City Public Library, Chesapeake Central Library, Grissom Library, Hampton Public Library, Heritage Library, Kirn Memorial Library, Main Street Library, New Kent Public Library, Newport News Public Library, Pamunkey Regional Library/Hanover Branch, Pamunkey Regional Library/King and Queen Branch, Pamunkey Regional Library/Upper King William Branch, Pamunkey Regional Library/West Point Branch, Pearl Bailey Library, Poquoson Public Library, Portsmouth Public Library, Richmond Public Library, Virginia Beach Central Library, West Avenue Library, Williamsburg Regional Library, and York County Public Library. Two printed copies of the ROD were hand-delivered to the City of Newport News for the Mayor and the City Manager. The comment period ended at the close of business on 4 May 2001.

6. Project History: In June of 1989, the City of Newport News invited the District to attend a briefing on the City's future water supply plans to be held on 13 July 1989. (According to a chronology of events prepared by the RRWSG, organizational meetings were held as early as 18 March 1987. However, the District was not involved until June of 1989.) The City of Newport News then presented their plan at the District's regularly scheduled federal/state interagency meeting later that same day. The initial interagency coordination meetings were held on 17 April and 8 May 1990. A notice of intent to prepare a Draft EIS on the City's proposed raw water supply was published in the Federal Register on 30 July 1990 and a Public Notice was issued on 1 August 1990 requesting public comments on the Scope of Study. The District's scoping outline and copies of letters received in response to the Public Notice were sent to the City of Newport News on 17 December 1990 as a guide for the preparation of their environmental report.

On 13 November 1990, the City of Newport News executed a specific agreement with the King William County Board of Supervisors for the King William Reservoir and Mattaponi River pumpover entitled "King William Reservoir Project Development Agreement." According to a chronology of events prepared by the City of Newport News, an earlier "Memorandum of Understanding" between Newport News and King William County for cooperative investigation of the King William Reservoir was in place on 23 May 1989. To the District staff's knowledge, no similar agreements were ever executed for the development of any other alternative. The District staff learned of the existence of this host agreement in late 1993 or early 1994, but was unaware that it had been executed before the EIS process began. The District only learned of the date of the agreement in January 1998, when a copy was provided by an opponent of the proposal who had obtained it from Newport News through the Freedom of Information Act. Up until seeing the agreement, the District and the federal agencies believed that the RRWSG had taken no steps to identify a preferred alternative before initiation of the EIS process.

James City County withdrew from the Regional Raw Water Study Group in March 1993 after the City of Newport News formally endorsed selection of the King William Reservoir as the Group's preferred alternative. James City County did not agree with this selection, as they believed the Ware Creek Reservoir alternative should be the Group's preferred alternative. It should be noted that the RRWSG's projected raw water deficit did not decrease upon James City County's withdrawal from the group. (The Ware Creek Reservoir project, originally proposed in 1984 by James City County, involved the creation of a 1,238-acre impoundment on a tidal freshwater tributary to the York River to provide 7 mgd of treated water. EPA vetoed the project in 1989 under Section 404(c) based on unacceptable adverse effects on the aquatic environment including the destruction of 425 acres of high quality wetlands. EPA viewed the project as environmentally costly and contributing to an unacceptable trend of wetland loss and reduction

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in freshwater flow to the Chesapeake Bay watershed. A reservoir at Ware Creek, with a pumpover from the Pamunkey River, was one of the alternatives considered by the RRWSG.)

On 6 July 1993, an environmental report and a permit application (which was found to be incomplete) were received from the City of Newport News. The Draft EIS published in February 1994 addressed 31 alternatives and carried forward 3 of these for detailed review: 1) a reservoir on Ware Creek between James City and New Kent Counties with pump-over from the Pamunkey River, 2) a reservoir on Black Creek in New Kent County with pump-over from the Pamunkey River, and 3) a reservoir on Cohoke Creek in King William County with pump-over from the Mattaponi River, which is the applicant's preferred alternative. As described in the DEIS, the originally proposed King William Reservoir (KWR-I) would have impounded a surface area of approximately 2,234 acres providing a storage volume of approximately 21.7 billion gallons with a safe yield of 25.5 mgd. The reservoir project was one component of what was at that time described as a 30.2 mgd regional raw water supply plan which included use restrictions and groundwater development. (In the Final EIS, the RRWSG recalculated the projected deficit, increasing it from 30.2 mgd to 39.8 mgd.)

When the original dam location was first presented to the District and the federal advisory agencies, the RRWSG reported that 293 acres of wetlands would be impacted (based on National Wetland Inventory mapping). By the time the Draft EIS was published, the applicant's environmental consultants had performed a more thorough review (based on aerial photo interpretation) and reported that 479 acres would be impacted. However in May 1994, a detailed wetland delineation of the King William site conducted jointly by environmental consultants working for Newport News Waterworks and James City County revealed that the reservoir would impact approximately 653 acres of non-tidal wetlands (based on field verification). The City of Newport News was advised by District staff on several occasions that such a large and unprecedented impact to high quality wetlands raised serious concerns.

In their 17 May 1994 and 1 June 1994 letters commenting on the Draft EIS, both the U. S. Fish and Wildlife Service and EPA commented that the DEIS was inadequate because it did not contain sufficient information to fully assess the environmental impacts and requested that the District prepare a Supplement to the DEIS. The Service also stated that the project may result in substantial and unacceptable impacts to Aquatic Resources of National Importance (ARNI). The District announced in a Public Notice dated 8 June 1994 that a Supplement to the Draft EIS was warranted to remedy the inadequacies of the document, address concerns raised during the public review and include the results of additional field studies, including the revised information on wetland impacts.

Of the three reservoir alternatives described in the Draft EIS, the Black Creek Reservoir in New Kent County was reported to impact the least wetland acreage (285 acres) and it appeared to the District and the federal agencies that it could be determined to be the least environmentally damaging of the reservoir alternatives. New Kent County indicated in their letter commenting on the Draft EIS that they were "not adverse to the construction of a regional reservoir at Black Creek" and would support the project "if a sufficient amount of that new supply were reserved for the use of New Kent County." The City of Newport News stated that a reservoir at Black Creek would not have enough storage area to satisfy both their projected deficit and New Kent County's desired host allowance. They further claimed that another reservoir and its associated wetland impacts would be required to make up that difference if the Black Creek Reservoir was determined by the District to be the environmentally preferred alternative. Based on this, Newport News requested that the District eliminate the Black Creek alternative from further consideration. The District did not concur because other non-reservoir alternatives could potentially meet

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the small shortfall in safe yield. In the District's letter dated 1 August 1994 outlining the informational needs for the Supplement to the Draft EIS, the City was subsequently given written notification that the King William Reservoir alternative could be determined to be environmentally unacceptable when other less environmentally damaging reservoir alternatives were available (including a smaller King William Reservoir).

Although New Kent County had been a willing participant up to that time, in September 1994, R. J. Emerson, Jr., the Acting County Administrator, announced that the County would no longer cooperate with the City of Newport News toward further analysis of a reservoir in Black Creek. On 27 October 1994, the City of Newport News sent a letter to the District outlining their detailed legal position for not providing any further analysis of the Black Creek Reservoir alternative and announced their intention to eliminate it from further evaluation in the information package they would supply for the Supplement to the Draft EIS. In a letter dated 21 November 1994, the District informed the City that unavailability of an alternative is not sufficient reason to eliminate it from further review under NEPA. Therefore, the District proceeded with the best available information on the Black Creek Reservoir alternative and it was carried forward as a "No Action" alternative (in accordance with 33 CFR 325 Appendix B, 9b(5)(a)) and compared in similar detail to the RRWSG's preferred alternative throughout the December 1995 Supplement to the Draft EIS.

Despite New Kent County's resolve not to cooperate with the City of Newport News, County representatives had written to EPA Region III on 17 June 1994 requesting a meeting to discuss the feasibility of developing a reservoir at Black Creek for their own uses. However, the meeting was never held. It is unclear whether the County opposes the development of a reservoir at the site; therefore, the Black Creek Reservoir alternative might once again become available to the City of Newport News. On 29 March 1996, the District wrote to New Kent County to learn if Black Creek was still unavailable to the City. The New Kent County Board of Supervisors indicated in a letter dated 23 April 1996 that the County remained committed to not cooperating with Newport News. They did not, however, withdraw their host agreement with the City to allow the construction of the pipeline from the proposed King William Reservoir across their jurisdiction.

The City of Newport News' host agreement with King William County stipulated that the reservoir would provide 47% dead storage for recreational purposes. This means that almost half of the water in the reservoir would not be available as water supply and Newport News would need to rely heavily on augmentation by river pump-over in order to meet the projected safe yield. Recreational potential already exists on most reservoirs without added dead storage, and the applicant's stated purpose of the reservoir is to provide a source of water, not year-round recreation. Therefore, in a 1 August 1994 letter, the District recommended that the King William Reservoir proposal be evaluated without the proposed 47% dead storage in order to reduce the project's reliance on the Mattaponi River. Both the Black Creek and the Ware Creek Reservoir proposals included 25% dead storage as a default value. The District also recommended that a discussion of a smaller King William reservoir that would reduce the 653-acre wetland loss be included in the Supplement to the Draft EIS.

The City of Newport News did not wish to reduce the size of the reservoir and asserted that a large reservoir would be environmentally superior since it would have the potential to meet some of the additional regional needs without constructing additional reservoirs. Therefore, in a letter dated 30 November 1994, the RRWSG proposed for agency consideration an enhanced King William Reservoir project with the same physical dimensions as KWR-I, but with an additional 45 to 120 mgd pumpover

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from the Pamunkey River to augment the 75 mgd Mattaponi River withdrawal. The enhanced project would supply between 6 to 15 mgd of additional treated safe yield benefit for other jurisdictions. The City of Newport News was advised that if they chose to pursue such a plan, the potential users must be identified, the additional need must be demonstrated and the alternatives to meeting the need within those jurisdictions must be investigated.

The City of Newport News had begun discussions with James City County, New Kent County and Hanover County, and had plans to contact Gloucester County concerning their participation in an enhanced King William project. Also, the District staff learned that James City County and New Kent County might be interested in obtaining water from Hanover County's proposed 25 mgd side-hill reservoir project (this permit application is currently inactive). The District staff recognized the potential to satisfy the needs of these localities as well as the potential for conflicting competition for the Pamunkey River as a water source. Therefore, the District staff arranged an interagency meeting for 19 December 1994 to learn each jurisdiction's short and long term water needs, their planning period and what alternatives they had already explored to meet those needs. However, in a letter dated 29 November 1994, Newport News stated strong objection to this action until they had "established clear parameters" on how these others might become partners with the RRWSG and expressed their fear that the District's involvement might disrupt the development of local institutional arrangements. Although the District did not concede to Newport News' proposed "ground rules" for the meeting, Newport News did attend and there were open discussions of the needs of these jurisdictions. None of the localities made any commitments for participation on regional cooperation for an enhanced project.

After considering this option for over a year, the RRWSG decided not to pursue the second pumpover at that time and on 14 June 1995, the City of Newport News submitted their information for the Supplement to the DEIS along with a revised permit application relocating the dam 2,900 feet upstream of the originally proposed dam location. In order to maintain the proposed reservoir storage volume, the pool elevation was raised from 90 to 96 feet to impound a surface area of approximately 2,222 acres with a storage volume of 21.2 billion gallons. Ninety-four acres of wetland impacts were avoided by moving the dam upstream; however, raising the pool elevation by 6 feet would inundate an estimated additional 15 acres of wetlands for a net reduction of 79 acres. The total wetland impacts were reduced to 574 acres at the revised dam location (KWR-II) and direct impacts to a bald eagle nest were avoided.

Although the City of Newport News stated that they had no plans to pursue the second pumpover, and the impacts of such a proposal were not evaluated in the EIS, they clearly did not abandon the potential for such an option. In the 8 August 1995 Addendum Number 2 to the King William Reservoir Project Development Agreement between the City of Newport News and King William County, a Pamunkey River pump station is included to provide a second pumpover to the proposed King William Reservoir as a way to enhance the safe yield of the reservoir and to supply water to jurisdictions other than those composing the group as of March 1995. Furthermore, in a 27 February 1996 Memorandum of Understanding, the City of Newport News has promised to provide an additional 4 mgd of water to James City County from an enhanced King William Reservoir.

In a letter dated 13 May 1996, the District recommended that the RRWSG recalculate water supply deficits for the region using the Virginia Employment Commission's revised population projections and by addressing the Virginia Department of Environmental Quality's comments on ways to reduce the estimated demand by up to 10.3 mgd. Also, the RRWSG did not calculate potential gains in water conservation from the Federal Energy Policy Act's efficiency requirements for low-flow plumbing

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fixtures manufactured after January 1994. Instead, these potential water savings were dismissed as being “uncertain.” Therefore, the District recommended that the RRWSG incorporate more aggressive and proactive water savings measures into their conservation plan. In light of the potential for reduced demand projections and more aggressive conservation, and the still significant wetland loss, the District informed the RRWSG that the feasibility of a downsized reservoir with a much more substantial reduction in the wetland loss should be addressed in the Final EIS. In their letter of 13 November 1996, EPA rated both the Draft EIS and Supplement to the Draft EIS as EU-2, which means that they found the magnitude of impacts associated with the project to be Environmentally Unsatisfactory and the documents did not contain sufficient information for EPA to fully assess the environmental impacts that should be avoided in order to protect the environment.

The City of Newport News maintained that a dam at the second location (KWR-II) would be technically superior from a long-term regional public water supply perspective. However, in view of the concerns of the District and other federal and state agencies over the loss of wetlands and wildlife habitat, the RRWSG elected to submit a second revised permit application on 30 December 1996 for a dam at a location 9,700 feet (1.7 miles) upstream of the originally proposed dam location, thus reducing the impacts to 437 acres of wetland/open water habitat (KWR-IV). Information submitted by the RRWSG for the Final EIS also included an additional dam location (KWR-III) that was never proposed to the District and the advisory agencies for consideration. The KWR-III location would be 7,500 feet upstream of KWR-I and would impact an estimated 511 acres of wetlands. In order to enhance the safe yield benefit of the KWR-IV reservoir, and minimize drawdown, the applicant retained their originally proposed 40/20 Tennant Minimum Instream Flow which allows for more frequent river withdrawals.

The City of Newport News claims that the 9 billion gallon reduction in storage capacity of the KWR-IV alignment makes the project only marginally adequate to meet the reasonably foreseeable water needs of the Lower Peninsula. Therefore, the City has made plans for future enlargement of the reservoir footprint back to either the KWR-I or KWR-II location. The City of Newport News asserts that if the dam was sited at the KWR-I or KWR-II location, the reservoir could supply between 2.2 and 3.9 mgd of additional treated water. In the 11 March 1997 Addendum Number 3 to the King William Reservoir Project Development Agreement between the City of Newport News and King William County, it is stated that the lands between the KWR-II and KWR-IV dam sites would be reserved for possible future downstream reservoir enlargement. The 186 acres of wetlands and 620 acres of uplands between the Cohoke Millpond and the KWR-IV dam site have been offered as part of the applicant’s mitigation package as a wildlife preservation area; however, the mitigation plan states that the land may not be preserved in perpetuity. Therefore, this entire area may eventually be impacted as well by future reservoir expansion, if permitted by all regulatory agencies. The Final EIS was published on 24 January 1997 based on the applicant’s revised application and information contained in their environmental report.

In their letter of 25 July 1997, commenting on the Final EIS, EPA did not change its “Environmentally Unsatisfactory” rating as they believed the loss of 437 acres of diverse and valuable wetlands/open water habitat within the Cohoke Creek basin would be significant. EPA re-stated that the wetlands at the project site qualify as an Aquatic Resource of National Importance (ARNI) due to their “diverse type, quantity and functional capacity.” Because major outstanding environmental and cultural issues remained and the Final EIS still contained some vague data and unsupported conclusions, EPA recommended the preparation of a Supplement to the Final EIS. Also, in their 25 July 1997 letter commenting on the Final EIS, the U.S. Fish and Wildlife Service recommended denial of the King William Reservoir due to the project’s impacts on wetlands, perennial and intermittent streams, upland wildlife habitat, alteration of

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downstream wetlands, elevation of salinity levels in the York River basin and impacts to the federally listed threatened sensitive joint-vetch (*Aeschynomene virginica*). The Service reaffirmed their 13 June 1994 position that these impacts would be extremely detrimental to the fish and wildlife resources of Southeast Virginia and will result in substantial and unacceptable impacts to an ARNI.

Three substantive critiques of the applicant's needs assessment were received from the public in response to the Final EIS. In March 1998, the District requested that the Corps' Institute for Water Resources (IWR) provide an independent technical review of the applicant's water needs forecast and the three critiques. IWR contracted with Planning and Management Consultants, Ltd. (PMCL) to perform an independent, third party review of the documents. In a May 1998 report, PMCL concluded that the RRWSG's projected water supply deficit of 39.8 mgd might actually be in the range of 16 to 19 mgd. The City of Newport News did not accept PMCL's findings and on 31 July 1998, provided a point-by-point rebuttal in which they questioned the objectivity of PMCL's review. In October 1998, the District requested IWR's review of the PMCL report and the City of Newport News' rebuttal to determine which was correct. IWR assembled a panel of four nationally and internationally recognized water resource experts to perform the review and presented the draft report of their findings to me during a 4 May 1999 briefing. The consensus of the panel was that Newport News Waterworks had significantly overestimated future demand and that the stated need was not supported by their data. Using the City of Newport News' numbers, the panel calculated a deficit of about 17 mgd by 2040 and concluded that the City of Newport News was not at risk if it did not immediately increase its water supply (see Section 7, Extent of Public and Private Need, for a full discussion).

Based on the lack of a demonstrated need to destroy 403 acres of vegetated wetlands, 34 acres of shallow open water and 21 miles of perennial and intermittent streams as well as the combined adverse environmental impacts of the project, I reached a preliminary position that the issuance of a permit for the project would be contrary to the public interest. My staff and I briefed the North Atlantic Division Commander and the HQUSACE staff of my preliminary position to deny the permit on 27 May 1999. The then Assistant Secretary of the Army for Civil Works (Dr. Joseph Westphal) was briefed on 28 May 1999. Dr. Westphal requested that I not inform Newport News of this preliminary position until he had informed the Governor of Virginia, U. S. Senators and interested Congressmen of the District's preliminary position.

On 3 June 1999, the late Congressman Herbert Bateman informed the City of Newport News of the District's preliminary position. I met with the City of Newport News and Congressman Bateman on 4 June 1999 to explain the rationale for my preliminary position and to deliver my letter of 4 June 1999 to the applicant. My letter of 4 June 1999 outlined the reasons for my preliminary position. In a letter dated 9 June 1999, the City of Newport News requested an additional 30 days to provide a rebuttal. On 14 June 1999, I granted a 30-day extension to the two-week response period. On 16 July 1999, the City of Newport News submitted their 132 page report entitled "Lower Peninsula Water Needs: A Summary Response and Rebuttal to Institute for Water Resources 'Special Study', May 1999" dated July 1999. In this report, the City of Newport News questioned the objectivity of one of the panel members, Dr. John Boland, and alleged that all panel members did not concur with the findings of the IWR report.

In a letter dated 8 June 1999, Virginia Governor James S. Gilmore, III informed me that he did not agree with my preliminary position of denial and urged me to determine that the King William Reservoir is the least environmentally damaging practicable alternative in the District's formal Record of Decision. As my preliminary position is contrary to the written position of the Governor of the state in which the work

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would be performed, the application must be referred to the North Atlantic Division Commander for resolution in accordance with the provisions contained in 33 CFR Part 325.8 (b)(2).

During a meeting on 19 July 1999, the City of Newport News and their water resources experts briefed me on their rebuttal to the IWR needs study. On 24 August 1999, the City of Newport News submitted a report entitled "Comparison of King William Reservoir Project with Recently Permitted Reservoirs in the Southeastern United States" dated, August 1999. On 24 September 1999, the City of Newport News submitted a report entitled "Alternatives Summary Report" dated October 1999. Subsequently, I requested that the IWR panel review all of the applicant's previous and recent submittals on water need (as well as those from the public) before meeting with the applicant and finalizing their report.

On 17 December 1999, a meeting between the IWR panel, various Corps of Engineers representatives and the City of Newport News was held at the IWR office in Alexandria, Virginia. Also in attendance were representatives from the Virginia Department of Health, Department of Environmental Quality, Department of Natural Resources, and Department of Commerce and Trade as well as aides from the offices of Congressman Bateman, Congressman Scott and Senator Robb. The purpose of the meeting was to provide an opportunity for the City to discuss the findings of the IWR report with the panel. At this meeting, the panel agreed to provide a list of measures to improve the major deficiencies in the RRWSG's analysis if they chose to provide further information in support of their deficit projections. In a letter dated 21 December 1999, Newport News Mayor Joe Frank outlined his understanding of what occurred at the meeting and requested that the District provide the list. On 22 December 1999, I provided an interim response to the Mayor's letter indicating that a detailed response would follow after the first of the year.

I reviewed all of the information submitted by the applicant in support of the proposed reservoir and found nothing that would lead me to change my preliminary position of denial. Therefore, in a letter dated 3 February 2000, I provided a detailed response to the Mayor's letter which confirmed my intention to recommend denial of the permit to the North Atlantic Division Commander. I reminded the City that this position was not based solely on the issue of need and that my preliminary recommendation of denial was based on the combined adverse environmental, cultural and socioeconomic impacts even if the City's entire projected need could be demonstrated through a new assessment. In this letter, I also provided the IWR list of major deficiencies, and outlined the options available to Newport News to bring the process to closure. In addition, I informed the Mayor that a collaborative effort between the City of Newport News, the District and the state to solve the RRWSG's water needs would not be possible until the conclusion of the permitting process.

In a letter dated 22 February 2000, Mayor Frank expressed his grave concern for the physical, cultural and economic health and well being of the over 600,000 water customers that depend on the City to provide them an adequate and affordable water supply. He also stated his belief that the cultural and environmental impacts of the King William Reservoir project have been overstated and those that will occur could be effectively mitigated. Mayor Frank stated that the City did not intend to abandon the King William Reservoir project by withdrawing their permit application. However, he requested until 31 March 2000 to inform the District whether the City would submit additional information on the need projections and on the perceived impacts to Native Americans. The District granted the requested extension.

On 30 March 2000, Newport News City Manager, Mr. Ed Maroney, requested an additional 7-month extension (until 1 November 2000) for the City to prepare and submit their new water needs assessment

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in support of the King William Reservoir project. In a letter dated 6 April 2000, I granted the requested extension and again cautioned the City that before they went to the additional expense of providing more information on water need, they should be reminded that I still intended to recommend denial of the project on the basis of combined adverse environmental, cultural and socioeconomic impacts. Because of this extension, the Norfolk District's recommendation to the North Atlantic Division on the application was postponed until the new information could be reviewed and considered in the recommended Record of Decision.

Newport News staff originally indicated that they did not need the final version of the IWR report for the preparation of their new water need information that would be submitted on 1 November 2000. However, in mid-August 2000, Newport News staff indicated that the final IWR report was indeed critical to the preparation of the new needs assessment. Accordingly, the IWR staff was requested to complete the final report as quickly as possible. The final IWR report was submitted to the Norfolk District on 12 October 2000. The panel's final conclusions on water need remained basically unchanged from those in the draft report and their analysis demonstrated that there is no imminent need to expand the City's water supply. The panel found that the RRWSG's data and assumptions implied a very small risk of shortage by 2020 and subsequent information suggests that the risk is likely even lower.

In a letter dated 21 April 2000, the Commander of the North Atlantic Division provided instructions to the Norfolk District outlining the procedures to be followed for completing the review and forwarding my recommendation on the permit application to the Division. On 3 May 2000, these procedures were announced in a Public Notice, which both appeared on the Norfolk District Regulatory Branch's Public Notice Web Page and was mailed to all parties on the District's mailing list for the project. The procedures are as follows:

The District's recommended Record of Decision will be published for a 45-day public comment period. In light of the numerous opportunities for public comment that the District has previously provided, Division did not require additional public hearings or meetings. All written comments received during this period will be analyzed and forwarded along with the final recommended Record of Decision to the North Atlantic Division. The North Atlantic Division Commander will provide a copy of the District's final recommended Record of Decision to those parties who submitted comments during the 45-day comment period. These parties will be afforded an additional 30 days in which to submit written comments to the Division. According to the 21 April 2000 letter, the Division Commander will consider only timely, written comments relevant to the final recommended Record of Decision (late comments, oral comments and comments related to new or additional information not previously submitted to the Norfolk District will not be considered). At the end of the 30 days, the Division Commander will conduct a review of the record and the Division Commander will issue a decision. The North Atlantic Division will not seek or entertain any additions to the record unless, in the course of the review, the administrative record is found to be deficient in some respect. If any deficiency is identified, the Division will open and supplement the record only to clarify the point in question. Publication of the District's recommended Record of Decision for public review and comment should address the recommendation from EPA and others for the publication of a Supplement to the Final EIS.

At the City's request, the North Atlantic Division arranged a facilitated meeting between the City of Newport News and the Norfolk District on 17 July 2000. The District staff believed that the purpose of the meeting was to discuss the findings of the City's new needs assessment. However, the City had apparently informed Division staff that they did not understand the rationale behind my preliminary

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position of denial and wished to discuss my letter of 4 June 1999 in detail. My staff and I had participated in numerous meetings with the City since my preliminary position letter and had already discussed all issues the City raised. At the facilitated meeting, District staff informed the City of Newport News that my recommended Record of Decision was nearing completion and would contain a detailed discussion on each issue. Furthermore, not all of the new information submitted to the District had been fully reviewed and incorporated into the document. District staff reminded the City that two separate opportunities for comment on my recommended Record of Decision would be provided before the Division's decision would be made. The District staff indicated that if the City still had questions after reading the recommended Record of Decision, the appropriate time to conduct further discussions would be during the comment period.

In a series of letters dated 20 July, 24 August, 26 August, 12 September, 25 September, 26 September, 2 October, 4 October, 5 October, 17 October, and 7 November 2000, the City of Newport News and their attorneys submitted requests under and concerning the Freedom of Information Act (FOIA) to view and copy the District's permit application file. Responses were provided to these requests and the City was provided copies of all requested documents that were determined by District Office of Counsel to be releasable at that time.

On 20 October 2000, the District granted the City's request for an additional one-month extension (to 1 December 2000) to provide additional information on their application. On 30 November 2000, the City submitted their revised water needs assessment along with further comments on several other issues. All information submitted by the applicant, state and federal agencies and the general public has been reviewed and fully considered in the preparation of the District's recommended Record of Decision on this project.

a. Publication of the District's Recommended Record of Decision: The District's Recommended Record of Decision (RROD) was published on 20 March 2001 with a 45-day comment period that ended on 4 May 2001. All information submitted by the applicant, state, federal and local agencies, non-governmental organizations and the general public has been fully reviewed and considered in the preparation of my Final Recommended Record of Decision on this project. My responses to comments submitted on the Recommended ROD are addressed by subject in the appropriate sections of this document and by commenter in Sections 17, 18, 19 and 20.

b. Comments Received on the RROD Regarding the History of the Project: In his letter dated 1 May 2001, Newport News Assistant City Manager, Randy Hildebrandt made several comments concerning the Project History Section of the RROD. Mr. Hildebrandt described the Project History section of the District's RROD as "replete with mischaracterization and innuendo" and "an attempt to manipulate historical information to portray the work of the Regional Raw Water Study Group and the City of Newport News, in the most negative way possible."

Mr. Hildebrandt characterized my statement on page 7 of the RROD that the District was not involved in the City's water planning until June 1989 as the RRWSG's attempt to circumvent the Norfolk District. My statement is factual only. I noted that the District had not been involved in the 1987 through 1989 organizational meetings.

Mr. Hildebrandt stated that the District's RROD nowhere acknowledges the benefits of regional cooperation. On the contrary, the regional cooperation of the Lower Peninsula jurisdictions and the host

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jurisdictions is described in the “Purpose” section of the RROD on pages 3 through 4. Also, the following statement appears in the “Beneficial Effects” section on page 158 of the RROD: “The regional cooperation between Newport News Waterworks and three other localities in the lower peninsula should reduce their competition for available supplies. The King William Reservoir would double the storage capacity of the current Newport News Waterworks system, would increase the Lower Peninsula’s current treated water safe yield by one-third and would provide a second river basin as a new source of water, thereby decreasing effects from moderate droughts. The City of Newport News would benefit from the sale of water from the reservoir to their customers as well as to the other RRWSG members. The reservoir could provide 3 mgd of water to King William County and 1 mgd to New Kent County as hosts should these localities choose to build the necessary facilities to obtain the water.” Also, page 184 states that the proposed King William Reservoir would be highly beneficial to Newport News Waterworks and their customers and host localities.

Mr. Hildebrandt takes issue with my discussion of the host agreement with King William County and says that I insinuated in the RROD that the City withheld information about the agreement. This issue requires further clarification. The RRWSG’s “Lower Virginia Peninsula Regional Raw Water Supply Plan 1990-2040 Phase 1 Summary Report” dated January 1991 states “In November 1990, King William County and the City of Newport News signed a Project Development Agreement which outlines the two jurisdictions’ mutual agreement on the terms and conditions upon which cooperative development of the King William Reservoir would proceed.” The District was informed that all three localities, King William County, James City County and New Kent County, were willing participants in the development of reservoirs in their jurisdictions. Therefore, Mr. Hildebrandt is correct that the District knew of a 1990 agreement between King William County and the City of Newport News. However, as the details of the agreement were not provided to the District, it was believed at that time that it was a general agreement for cooperation as host for the King William Reservoir. This does not conflict with Mr. Hildebrandt’s statement that the 1990 King William Reservoir Development Agreement was referenced in an appendix to the February 1994 Draft EIS. As stated in the RROD, the District learned of the existence of a more specific agreement in late 1993 or early 1994 and although the District had requested a copy of the agreement and its various amendments, it was never provided by the City of Newport News. Therefore, the District did not know until actually viewing a copy of the agreement in 1998 that the specific agreement was the same one that had been executed in 1990, and that it was a very detailed 24-page signed contract, rather than a general agreement for cooperation. It does not seem logical that the RRWSG would execute such an extremely detailed contract with a locality unless it intended to construct the project within that jurisdiction. As stated in the RROD, the District is unaware of the execution of any such detailed agreement for any of the other alternatives presented in the FEIS.

Mr. Hildebrandt contends that the District tried to change New Kent County’s opposition to a reservoir in their jurisdiction before issuance of the FEIS. As stated on page 9 of the RROD, the District only asked New Kent County in 1996 if the Black Creek alternative was still unavailable to Newport News as it had been in 1994.

Mr. Hildebrandt contends that the District was inflexible and made the idea of a larger reservoir unattractive to Newport News “... by insisting that further consideration of this concept would require starting the EIS process all over again...” and “...Newport News had no choice other than to drop this concept.” As stated on page 10 of the RROD, the City of Newport News did not wish to reduce the size of the King William Reservoir as recommended by the District and the advisory agencies. Instead in November 1994, they asked the District and the advisory agencies to consider an enhanced reservoir

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project with a second pumpover that would provide additional safe yield for other jurisdictions. The District did not try to discourage this concept. As stated on page 10 of the RROD, "The City of Newport News was advised that if they chose to pursue such a plan, the potential users must be identified, the additional need must be demonstrated and the alternatives to meeting the need within those jurisdictions must be investigated." Such an evaluation is a requirement of the Corps of Engineers' permit review under NEPA. The fact that Newport News waited until after publication of the Draft EIS to identify this alternative would necessarily involve some delay in the EIS process while it was investigated. The addition of this alternative would not, however, have involved "starting the EIS process all over again." Newport News was informed that the enhanced project could be addressed in the Supplement to the Draft EIS that the District had announced on 8 June 1994 would be required to address the inadequacies of the Draft EIS. Newport News decided not to pursue the second pumpover and did not include it in the information they submitted on 14 June 1995 for the Supplement to the Draft EIS.

Mr. Hildebrandt contends that the preservation of the land between Dam Site IV and Dam Site II for the possibility of a larger reservoir is not a "scheme" to expand the reservoir at some future date, but was a commitment to King William County in order to secure their approval for Dam Site IV. He further stated that the City has no plans to expand the reservoir to meet the RRWSG's needs. It remains unclear to me why the City would offer the wetlands between Dam Sites IV and II as part of the mitigation plan, but would decline to preserve the land in perpetuity unless they are in fact reserving the land for future expansion. As Mr. Hildebrandt accurately states, a future expansion of the reservoir, if it were proposed, would require a permit from the Corps of Engineers. Mr. Hildebrandt has made no argument that would convince me to change my determination that a future expansion should be considered as a reasonably foreseeable activity in the Corps of Engineers' evaluation of this project.

Mr. Hildebrandt takes exception to my statement in the RROD that the December 1999 meeting was arranged at the City's request. Mr. Hildebrandt stated that "After observing our December 17, 1999 meeting with the IWR panel and the Norfolk District, NAD believed that the City, the State and the District were not communicating effectively with each other on this project." It was my understanding that the meeting was arranged at the request of the City of Newport News, but this may not have been the case. At the December 1999 meeting, attorneys representing the City of Newport News conducted their questioning of the IWR panel in a deposition format and the City made a verbatim recording of the meeting. While this did not provide a comfortable atmosphere, the City's own record of the proceedings demonstrates that there was an open and honest exchange of information between the participants.

Mr. Hildebrandt claims that the relationship between the City and the District has degenerated into an adversarial one. Mr. Hildebrandt claims that after I announced my preliminary decision in June of 1999, my staff had no open exchange of views with Newport News staff and met only twice with them between June of 1999 and December 1999. He also claims that the City's information submitted in response to my June 1999 preliminary decision was largely ignored. He stated that my staff refused to tell the City why their project had unacceptable environmental and cultural impacts. Unfortunately, Mr. Hildebrandt, his staff, and consultants have created the appearance of an adversarial atmosphere with accusations in their correspondence and in comments to the media. I am not influenced by these comments, and my staff and I have maintained a polite and respectful dialog with the applicant, both in writing and during meetings. Since the announcement of my preliminary decision on 4 June 1999, my staff and I participated in all meetings requested by the City of Newport News and their representatives to discuss whatever topic they chose to address, including meetings to discuss the water need issue, the suspension of the 106 process and other environmental impacts. My staff and I were never unwilling or unavailable to meet with the

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City of Newport News, when they requested meetings. I granted every request the City of Newport News made for time extensions in order for them to prepare and submit additional information in support of their project. As stated on page 13 of the RROD, I reviewed all of the information submitted by Newport News and discussed it in the RROD. However, the submittal included very little new information and the City's restatement of their previous arguments did not lead me to change my preliminary position of denial.

Mr. Hildebrandt claims that I did not view the permitting of the City's project as one of my priorities when I first came to the District and that I was greatly influenced by my staff in reaching conclusions on the merits of the permit application. When I assumed command of the Norfolk District in August 1998, I did not intend to be involved in the day-to-day processing of my staff's projects because of my full schedule and other duties. Therefore, I advised the City of Newport News that Mr. William Sorrentino, Chief of the District's Technical Services Division would attend meetings in my place. However, former Regulatory Branch Chief, William H. Poore, Jr., convinced me that the King William Reservoir Project was of such a complicated and controversial nature that I should continue the precedent set by my predecessor, Col. Robert Reardon, and meet directly with the applicant. I took my staff's advice and attended progress update meetings requested by Mr. Hildebrandt and his staff. Technical meetings continued to be attended by my staff alone as they had been during previous commands. Since I arrived at the District, my staff has kept me fully briefed and I was intimately involved in the processing of the King William Reservoir permit application.

Mr. Hildebrandt disagreed with my statement that "The City also incorrectly assumed that because they followed the District and federal agency guidance and direction, that the outcome of the permit review process would automatically be in their favor, although they had been repeatedly advised against such an assumption throughout the processing of the application." He stated that "...we knew that a favorable permit decision was never a certainty, especially in view of the attitudes of the principle District staff which were assigned to work on our application." Although Mr. Hildebrandt does not agree with my statement, he went on to admit that "The message we heard was that if we followed the guidance of federal regulatory staff and if we deferred to and adequately addressed the District's concerns, the project would be permitted." I do not understand Mr. Hildebrandt's distinction between my statement in the RROD and his statement. The fact that my staff did not encourage the City of Newport News to believe that the issuance of a permit for their project was a certainty may be what he referred to as "the attitudes of the principle staff."

Finally, Mr. Hildebrandt stated that the City's project had not received a fair and objective public interest review. Many District staff members were involved in the evaluation of this project. At the staff level, the project manager coordinated the efforts of several team members assigned to address various issues. These staff members were supervised by a Regulatory Section Chief, who was supervised by a Regulatory Branch Chief, who was supervised by a Technical Services Division Chief. Due to the size of the project, the degree of the impacts, and the degree of public interest in the project, all supervisory levels below me and I have remained extremely informed and involved throughout the processing of the application. In addition, the District utilized the resources of multidisciplinary interagency teams to review and evaluate many aspects of the proposal. The District sought the advice of two specialized Corps research labs (IWR and WES) to evaluate comments received on the applicant's analysis of water need and salinity modeling. When the applicant objected to the IWR's initial findings, the District requested IWR to convene a panel of nationally recognized experts in water resource planning to review

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IWR's finding as well as the applicant's response. The District expended substantial resources to ensure that the project was thoroughly and objectively reviewed.

Also, in a letter dated 4 May 2001, Mr. George Somerville, attorney for the RRWSG, stated that contrary to implications in the RROD, Newport News and the RRWSG did not select the King William Reservoir project as their preferred alternative until February 1993 and April 1993, respectively. He stated that the King William Project Development Agreement preserved the King William Reservoir as an option, but did not lock the RRWSG into that option and that the RRWSG did not give up on the Black Creek alternative until New Kent County officials made it clear that local cooperation would not be granted. The RROD acknowledged on page 8 that Newport News formally endorsed the King William Reservoir as the RRWSG's preferred alternative in 1993. As Mr. Somerville stated, the language of the City's agreement with King William County does not "lock the RRWSG into that option," however, the fact that a highly detailed, signed contract was in place only for the King William Reservoir project several years prior to the formal endorsement leads me to conclude that the City of Newport News was predisposed to that alternative. As outlined on page 9 of the RROD, the RRWSG attempted on two occasions to eliminate the Black Creek alternative from further consideration in the EIS process.

7. Extent of Public and Private Need: In the Final EIS, the City of Newport News predicted that by 2040, the lower Peninsula would have a shortage of 30 mgd if nothing is done to expand existing supplies. The Norfolk District is aware that the Lower Peninsula will need additional public water supply as the population in the region grows. However, the question is whether the assumptions the City of Newport News has applied in their calculations of future demand are appropriate. The District relies on the applicant to submit accurate information in support of a permit application. Despite the expected increases in residential and economic development during the 1990's, growth in water demand has not increased at the same rate as in the 1980's as predicted by the City of Newport News. In fact, Newport News Waterworks data demonstrates that actual water demand has remained almost the same from 1990 to 2000. The applicant claimed that 25 percent of future demand would be met through conservation and by imposing stringent water-use restrictions in times of severe drought. The Virginia Department of Environmental Quality commented that the RRWSG was planning for the largest project possible and that with all of the safeguards that are incorporated into the plan as proposed, the likelihood that water use restrictions would ever be imposed is very slight.

The federal advisory agency representatives and my staff recognized the need for more information to support the applicant's demand projections and requested additional information to be included in both the Supplement to the Draft EIS and the Final EIS. Therefore, in a letter dated 1 August 1994, the District requested that a discussion of how conservation measures would be implemented in each locality and a more comprehensive explanation of the RRWSG's drought planning be included in the Supplement (including indicators used to assess drought conditions and the means by which use restrictions will be enacted and enforced). The District requested that the applicant also address the potential downsizing of military facilities in the region and associated employment reductions at military suppliers such as Newport News Shipbuilding in the calculation of future water supply demand. The District requested that the RRWSG fully consider and address in the Supplement a recommendation for a non-structural approach to meet the region's needs contained in a 1990 University of Virginia Urban and Environmental Planning report submitted by the Southern Environmental Law Center in response to the DEIS entitled "Demand Management and Raw Water Supply Alternatives for the Lower York-James Peninsula 1990-2030."

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The District staff learned that the Virginia Employment Commission's 1993 revised population projections were lower than those used by the RRWSG; therefore, the District requested in a letter dated 13 May 1996 that the water supply deficits for the region be recalculated for the Final EIS. The District and the federal advisory agencies believed that the RRWSG had underestimated the potential for water conservation and had inaccurately characterized the Lower Peninsula's consumption rates by comparing them to those of cities in dry western states where outdoor water use is considerably higher. The RRWSG was also advised that as they had not provided the more comprehensive discussion of their drought planning or included a discussion of how conservation measures would be implemented in each locality as requested for the Supplement, these should be provided for publication in the Final EIS. It was also recommended that the Final EIS address the Virginia Department of Environmental Quality's comments on methods to reduce the projected demand by up to 10.3 mgd. The District also recommended that the RRWSG's conservation plan address more aggressive water savings measures such as a region-wide incentive program for retrofitting of high water use fixtures in older homes, incentives for industries (both existing and new) to implement non-potable water reuse systems and reduction in outdoor uses at times other than during emergency restrictions.

It was further recommended that consideration of growth limitations due to building restrictions imposed by the Chesapeake Bay Act be taken into account when projecting 2040 populations and total build-out. An evaluation of the effects of military downsizing on employment at the Langley Research Center and the Newport News Shipyard and verification that the Army will not maintain the Big Bethel Reservoir for water supply were also requested for the Final EIS. In light of the potential for considerably reduced demand projections and more aggressive conservation, the District informed the RRWSG that the feasibility of a downsized reservoir with a much more substantial reduction in the wetland loss than that shown in the Supplement should be explored in the Final EIS.

Three substantive critiques of the applicant's needs assessment were received in response to the Final EIS: (1) a critique dated 14 July 1997 prepared by Michael Siegel and Dr. Thomas Muller on behalf of the Alliance to Save the Mattaponi and the Sierra Club entitled "Analysis of the Lower Virginia Peninsula, Regional Raw Water Supply Plan, Environmental Impact Statement, January 1997," (2) a critique dated 23 July 1997 prepared by Scott Chaplin for the Rocky Mountain Institute entitled "Comments Regarding the Final Environmental Impact Statement (FEIS) for the Lower Virginia Peninsula Regional Water Supply Plan 1990-2040," and (3) an undated critique prepared by Dr. Donald H. Phillips, President of the West Point Hunt Club, Inc. entitled "Comments on the Final Environmental Impact Statement for the Regional Raw Water Study Group's Lower Virginia Peninsula Raw Water Study Plan." All of these critiques alleged that the applicant's projected water need was greatly overstated.

a. First IWR Review: The Corps of Engineers' Institute for Water Resources (IWR) was requested in the Norfolk District's Scope of Work, dated March 1998 to provide an independent technical review of the applicant's water needs forecast and the three critiques. IWR contracted with Planning and Management Consultants, Ltd. (PMCL) to perform an independent, third party review of the documents. PMCL submitted an interim report on 6 April 1998 and a draft final Report (Task B) on 23 April 1998. Their final report entitled "Review of Water Supply Needs Assessment for the Regional Raw Water Study Group, Newport News, Virginia." was submitted in May 1998. The PMCL report and the public critiques pointed to possible flaws in the data used to estimate need and questioned the validity of the methodology used by Newport News Waterworks to calculate the projected need for the RRWSG through the year 2040. According to PMCL's evaluation, numerous inadequacies in the analytical methods used

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by the RRWSG tended to overestimate future demand as well as underestimate future supply. PMCL concluded that the projections of population served and employment were optimistic relative to the national projections and that residential conservation was underestimated. PMCL also found a lack of justification for excluding the supply capacity of the Big Bethel reservoir in the RRWSG's future supply.

Therefore, PMCL concluded that the RRWSG's projected water supply deficit of 39.8 mgd might actually be in the range of 16 to 19 mgd. The City of Newport News commented in a letter dated 22 May 1998 that they had found the report to be seriously flawed and biased. The Norfolk District arranged a meeting between the City, IWR, and PMCL on 8 July 1998 so that the City could present their views and discuss the report with the reviewers. In a letter dated 31 July 1998, the City provided a point-by-point rebuttal of PMCL's findings and questioned the objectivity of PMCL. Additional comments were also submitted by Mr. Michael Siegel, Dr. Thomas Muller, and Dr. Donald Phillips on both the PMCL report and the Newport News Waterworks rebuttal.

b. Second IWR Review: In a second Scope of Work dated October 1998, the Norfolk District requested IWR to review the differences between the PMCL report and the City of Newport News rebuttal, as well as the additional public comments, and as the Corps' experts in water use forecasting and conservation, provide their independent expert opinion on the most reasonable position for each contended issue. During the IWR review period, both Newport News Waterworks and some of the authors of the critiques met with IWR staff to discuss their findings and submitted further written comments for IWR's consideration. The City of Newport News also submitted a report in support of their projections prepared by Research and Planning Consultants, January 1999 entitled "Review of Planning Assumptions for Water Needs Assessment Lower Virginia Peninsula."

IWR assembled a panel of four nationally and internationally recognized water resource planning experts to conduct the review. William J. Werick, the panel member from IWR was joined by John J. Boland, a Johns Hopkins University professor; Jerome Gilbert, a former President of the American Water Works Association and former manager of the East Bay Mud Utility; and Roland C. Steiner of the Interstate Commission on the Potomac River Basin. IWR met with the City of Newport News on 14 December 1998 and with the principal critics of the City's study on 15 December 1998 to ensure that both sides had an equal opportunity to explain their case. IWR then developed and distributed to all involved parties a list of key questions to be answered. An EXCEL spreadsheet was developed to estimate how uncertainty in each component of the forecast affected the forecasted amounts of water use. IWR presented the draft report of their findings to my staff and me during a 4 May 1999 briefing.

The panel did not prepare an alternative forecast, rather they prepared an alternative calculation of the RRWSG's need using the same forecasting approach as Newport News and most of the same data, but replaced certain assumptions they deemed questionable with more plausible numbers. The panel's interpretation of the data arrived at a significantly different deficit than that projected by Newport News Waterworks. The consensus of the panel is that Newport News Waterworks has significantly overestimated future demand and that the stated need is not supported by their data. The City of Newport News based their population projections on optimistic local government estimates, which are much higher than the projections of the U. S. Census Bureau and the Bureau of Economic Analysis. Likewise, the City of Newport News' estimate of future employment growth is higher than the federal government projections. The panel concluded that the RRWSG's per capita domestic water use estimate did not reflect the potential for additional conservation through the use of water conserving fixtures and appliances. In addition, the City of Newport News appears not to have sufficiently considered reliability-based planning

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incorporating drought management, which would allow a better assessment of the risk from future deficits.

Therefore, the panel concluded that the City of Newport News had not convincingly established the need for a 39.8 mgd increase in its water supply. IWR reviewed each section of the demand and supply projections and reported that certain assumptions underlying the forecast appeared questionable. Based on differences in population projections, employment structure, domestic, commercial and industrial water use calculations and conservation, the panel calculated a deficit of about 17 mgd by 2040. Since the safe yield is the amount of water available during an extreme drought, such infrequent supply shortfalls can be efficiently managed by infrequent demand curtailments and other less damaging sources. There is only a 1 to 2 percent chance that the drought of record will re-occur in any given year. Therefore, the panel concluded that the City of Newport News is not at risk if it does not increase its water supply at this time.

The IWR report recognized two major alternatives that are available to the RRWSG to meet the smaller deficit of 17 mgd and significantly reduce deficits and the risk of future water shortages. The Final Environmental Impact Statement outlines the RRWSG's long-term plans for the development of 4.4 mgd of fresh groundwater and 5.7 mgd of brackish groundwater supplies along with 7.1 to 11.1 mgd of conservation and use restrictions in addition to obtaining 23.2 mgd of safe yield from the proposed King William Reservoir. Therefore, the combined 17.2 to 21.2 mgd safe yield of the non-reservoir components would meet the 2040 deficit of 17 mgd. If both groundwater sources are used as planned, they could substantially reduce deficits and the risks of water shortages. In fact, Newport News' \$17 million dollar brackish groundwater desalination plant is now in operation and provides about 5.7 mgd of supply. (The Final IWR report further clarified that neither Newport News' calculation of a 39.8 deficit nor IWR's calculated 17 mgd deficit included conservation or water use curtailment. When IWR's estimated conservation benefit and water use restrictions from Newport News' Stage 2 Drought Plan are included, the 2040 deficit would be reduced to 4.96 mgd. The City's newly constructed desalination plant would eliminate this supply shortfall.)

Late in the IWR study, the City of Norfolk revealed that it had a surplus of 32 to 45 mgd of water for sale because the City of Virginia Beach started using water from Lake Gaston exclusively in 1997 and no longer purchased water from them. The exact amount of this surplus and the length of time the water will not be needed by users in the southside of Tidewater have not been established. While IWR did not believe this water could be assumed to meet all of the RRWSG's long-term needs, if some or all of it is available in the near to mid-term, it would further diminish the risk of water shortages that the RRWSG would experience.

c. Newport News Rebuttal of IWR Report: On 16 July 1999, the City of Newport News submitted their rebuttal to the draft IWR report. During a meeting on 19 July 1999, the City and their water resources experts, Research and Planning Consultants (RPC) briefed me on their rebuttal. Also, in a letter dated 18 August 1999, RPC submitted additional comments on the IWR review of the City's water demand projections. On 17 December 1999, a meeting between the IWR panel, District staff and the City of Newport News was held at the IWR office in Alexandria, Virginia to provide an opportunity for the City to discuss the findings of the IWR report with the panel. At this meeting, Newport News' attorneys questioned each panel member concerning their contributions to the report and their support for its findings. Each member affirmed his unqualified support for the IWR report.

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In a letter dated 30 March 2000, Newport News City Manager, Mr. Ed Maroney indicated that the City intended to submit to the District a new water needs assessment in support of the King William Reservoir and requested a 7-month extension (until 1 November 2000) in order to prepare their report. On 6 April 2000, I granted the City's request. Therefore, the Norfolk District's recommendation to the North Atlantic Division on the application had to be postponed until the information was received, reviewed and addressed in my recommended Record of Decision.

Newport News staff originally indicated that while they would like to have the final version of the IWR report, it was not likely to be very different from the draft and would not be needed for the preparation of the City's new water deficit information. However, in mid-August 2000, Newport News staff informed the project manager that the final IWR report was critical to the preparation of the new needs assessment. Accordingly, the District requested that IWR complete the final report as quickly as possible. The Final IWR report was submitted to the Norfolk District on 12 October 2000 and sent electronically to all interested parties on the same day. On 20 October 2000, the District granted the City's request for an additional 30 days (until 1 December 2000) in order to provide additional information in support of their project.

d. Final IWR Report: In the Final IWR Report, the panel's conclusions on water need remained basically unchanged. In fact, information developed since the draft report was released provided even stronger support for the recommendations contained in the draft report. Those findings are as follows: Newport News forecasted that in the year 2020, water use would exceed safe yield by about 27 mgd. However, this figure does not reflect the reduction in water use through long-term conservation because those figures are reported separately as a supply alternative. Accounting for long-term conservation reduces the 2020 deficit to less than 23 mgd. Since publication of the EIS, the City of Newport News has completed their proposed groundwater desalination plant which produces 5.7 mgd of high quality drinking water, thereby reducing the 2020 deficit further to about 17 mgd. Newport News estimated that Tier II drought measures would reduce water use by about 6 mgd, dropping the deficit to 11 mgd. Tier III of the Newport News drought plan would reduce the deficit even further to 5 to 6 mgd. The chance that this 5 to 6 mgd deficit will actually occur is the chance that the drought of record will re-occur, which is about 1 to 2% in any year. This assessment of risk was made in the draft IWR report using the RRWSG's assumptions and did not include other supply sources that Newport News had considered or transfers of water from the City of Norfolk.

Information received since release of the draft report allowed IWR to adjust their analysis. In the Final EIS, water use was forecast to grow by 10 mgd in the last decade. However, water use has actually remained flat and will be lower than IWR originally predicted. Also, James City County has announced plans to construct a 6 mgd groundwater desalination plant to open in 2005, rather than waiting for the outcome of the King William Reservoir permit application in order to solve their long-term water needs. This project was not among the alternatives that the RRWSG considered, but if built, would reduce the need for an additional surface water supply.

Furthermore, the IWR panel found even less evidence to support the use of 25% dead storage in the existing Newport News system. In past analyses, the safe yield of the Newport News system was calculated assuming 10 to 11% dead storage. However, in the EIS, the RRWSG calculated a lower safe yield based on 25% dead storage. A 1 March 1996 memo from DEQ states "Newport News could get a waterworks certificate based on 11.8% dead storage from the Health Department." The IWR panel acknowledged that water from the lower regions of the reservoir may be more costly to treat, but would

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provide a yield roughly equivalent to Newport News' new desalination plant, which costs \$17 million. Reducing the dead storage to previous assumptions would add another 7 to 10 mgd of safe yield and further reduce near term risk.

Also, Newport News predicted that the Big Bethel Reservoir would not be producing water in 2010, but offered no analysis to support its abandonment. The Final EIS described Big Bethel as an efficient source of high quality drinking water with a safe yield of approximately 2 mgd. According to the Fort Monroe website, the Army made a significant investment in 1997 to upgrade water treatment at Big Bethel. Furthermore, in a letter dated 14 January 1999 to the Norfolk District Commander, Air Force General Earnest O. Robbins II stated "It is our understanding from conversations with (Fort Monroe Department of Public Works) personnel that Big Bethel will continue to serve Langley Air Force's needs and that the City of Newport News municipal system will be relied upon in case of emergencies or when additional water supply is required." Therefore, the IWR panel questioned the RRWSG's assumption that Big Bethel will no longer be in operation by 2010.

The Department of Health requires utilities to begin planning for additional supplies when water production reaches the 80% threshold, but does not require the construction of any particular alternative to provide those supplies. Based on discussions with the Health Department in December 1999 and a review of the Health Department's newly reorganized and clarified version of their regulations, the IWR panel concluded that its recommendations do not conflict with the so called "80% rule." Newport News Waterworks could pursue any alternative or combination of alternatives that would provide the additional supplies.

The IWR panel found the RRWSG's interpretation of a requirement to match safe yield to maximum daily water use as highly unusual. The RRWSG's analysis in the Final EIS failed to accomplish such a design capacity. Likewise, the Department of Health's own assessment that the addition of the King William Reservoir would meet the region's water needs through 2040 did not meet this design capacity. The IWR panel concluded that it is more likely that the requirement is for the design capacity of the treatment plant and transmission equipment than for the safe yield of the water supply itself. The Virginia Department of Health recently approved plans for improvements to increase the design capacity of the Lee Hall Treatment Plant which should assist Newport News Waterworks in meeting its maximum daily demand. In addition to Newport News' 5.7 mgd groundwater desalination plant already in operation, James City County plans a 6 mgd groundwater desalination plant in 2005. Therefore, the panel concluded that up to 11.7 mgd of additional supply would be available to the RRWSG long before 2040.

The panel found that the RRWSG's demand studies did not show an imminent need for additional water supplies and that the applicant's data and assumptions implied a very small risk of shortage by 2020. Subsequent information suggests that the risk may be even lower than previously stated. Although the IWR panel admits that no point forecast, including their own, represents the complexity of the situation, their analysis demonstrates that there is no immediate need to expand the City's water supply. Finally, the panel suggested that a collaborative risk assessment of future water supply need of the region be undertaken that would compare the costs, benefits and risks of a wide variety of supply and demand alternatives.

James City County proposed the Ware Creek Reservoir in order to meet their 40 year projected deficit of 7 mgd. Due to the EPA veto, the Ware Creek Reservoir was never built. James City County has been able to avoid their anticipated water supply crisis by implementing long-term solutions that do not require

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dependence on the proposed Ware Creek or King William Reservoirs. They have accomplished this by requiring more intense water conservation efforts (i.e., voluntary water conservation) and by planning for the construction of a 6 mgd groundwater desalination plant. However, James City County still supports the construction of the King William Reservoir and in their 14 September 2000 letter to the Regional Administrator of EPA, Bradley Campbell, they requested that EPA re-examine their oversight role for regulations to provide safe and reliable supplies of drinking water.

On 27 October 2000, the City of Newport News submitted a report entitled "Evaluation of Safe Yield Benefits From King William Reservoir Project" which re-calculated the safe yield of the King William Reservoir (KWR-IV) in consideration of the conditions and restrictions outlined in the Virginia Water Protection Permit. The report indicated that the treated water benefit of the reservoir to the RRWSG members would be between 19 to 21 mgd.

e. Newport News' Revised Needs Assessment: On 30 November 2000, the City of Newport News submitted an updated water needs report by HDR Engineering, Inc., entitled "Lower Virginia Peninsula Regional Raw Water Supply Plan Water Needs Assessment 2000-2050" confirming the City's contention that their earlier estimates of water need were not overstated and that the Peninsula will face a high risk of water shortages unless the King William Reservoir is built. This report acknowledges for the first time that water supplies in the 1990's had been more plentiful than predicted due to the development of new groundwater sources, and decreased demand as a result of higher water rates, conservation and wet weather. The report concluded, however, that even with conservation, regional water demands will exceed the available supply by 2010 and that there will be a 50% chance that the Peninsula will need an additional 22 to 27 mgd of water supply by 2050. This would be due in part to a steady growth in population over the next 50 years. However, the deficit may be as modest as 15 mgd or as large as 36 mgd depending on the rate of regional population and economic growth. The report stated that there is a 75% chance that even an additional 22 mgd supply will not meet the Peninsula's needs in 2050, and that the Peninsula will need even more than the 19 to 21 mgd that the reservoir would provide if there is a drought more severe than any in the last 70 years.

The City also claimed that they would not be able to obtain permits for the 4.4 mgd fresh groundwater component of their plan and that without the reservoir, conservation measures and use restrictions would provide only 4.8 mgd of safe yield instead of the 7.1 to 11.1 mgd stated in the Final EIS. Combined with the 5.7 mgd from their new groundwater desalination plant, the City reported that the non-reservoir components of their plan would only provide 10.5 mgd of safe yield benefit rather than the 17.2 to 21.2 mgd reported in the FEIS. The City of Newport News also submitted a separate letter commenting that they had identified serious flaws in the IWR Final report. Newport News contends that "We have found that the conclusions reached by this panel in their final report are inaccurate and misleading and should therefore be discounted." These reports and all other supporting documents supplied by the City of Newport News were forwarded to the IWR panel for review and analysis. Figure ES-1, below shows the City's estimate of future water need.

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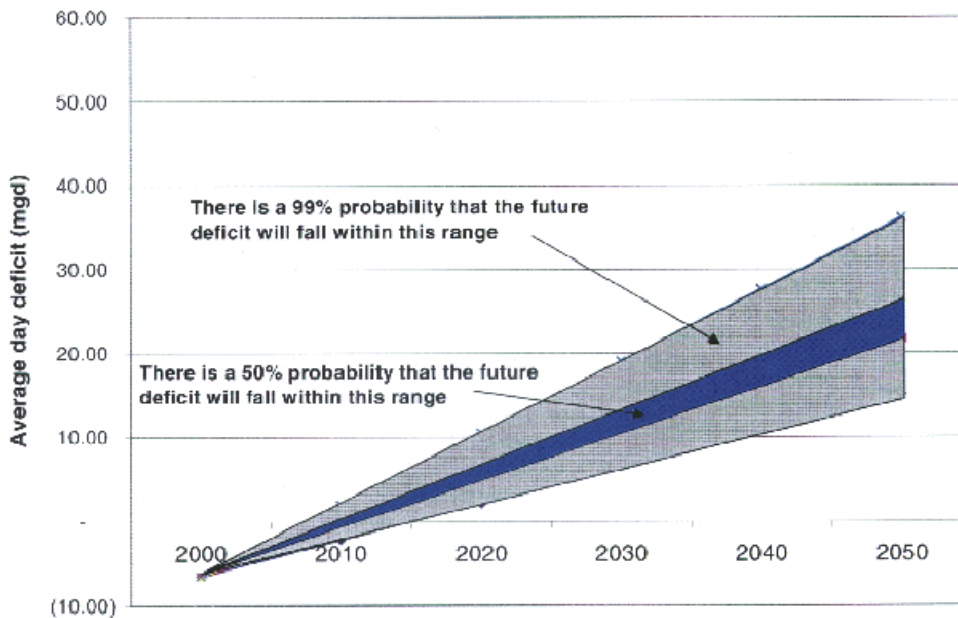


Figure ES-1. Estimate of Future Water Need, or Water Supply Deficit

f. IWR's Review of Newport News' Revised Needs Assessment: In their March 2001 report entitled "An Evaluation of the Risk of Water Shortages in the Lower Peninsula, Virginia," the IWR panel reported on their review of the HDR report and supporting documents. The IWR review panel examined the assumptions, methods, results, and interpretations contained in the new studies submitted by the applicant. With the assistance of its consultants, the IWR panel replicated the demand, supply and deficit analyses of the applicant, both to verify reported results and to test the sensitivity of those results to key assumptions. The IWR panel found that its prior recommendation of a collaborative risk assessment for future water supply needs was at least partially satisfied by the new studies. For this reason, the IWR results and the results of the HDR study cannot be compared directly to any of the reports that preceded them. Previous reports compared point estimates of future water needs to the safe yield of the water system. The panel criticized that approach because it masks the real and potentially critical uncertainty in any long-term forecast. The panel feels strongly that the "deficits" reported in previous analyses are far less useful than information on "risk of shortage."

The IWR panel's estimates of future water use and supply were very close to those of HDR. The panel's estimate of probable 2050 demands was about 5% less than HDR's because the panel believed that HDR overestimated unaccounted for water and market penetration. The IWR panel's point estimate of groundwater yield was the same as HDR's, however the panel's probabilistic estimate was a little higher because it allowed for the possibility of higher yields. The panel's estimate of the safe yield of the current surface water supply was 56.7 mgd, as compared to HDR's estimate of 56.5 mgd.

The most significant difference between the conclusions of the IWR panel and HDR analyses is in how the results were presented. HDR reports the probable difference between future water use and the

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minimum expected supply (safe yield). Safe yield is the minimum amount of water the system will produce over a long period of time during an extreme drought. The IWR panel has criticized this approach since the system will produce more water than the safe yield 98% of the time. Therefore, since actual supply will nearly always exceed safe yield, this approach exaggerates the risk of future deficits.

No one can accurately predict what water supply or water use will be in the year 2050 with any precision, but it can be said that the uncertainty about future water supply is different from the uncertainty about future demand, and the risk assessment must be structured to reflect those differences. IWR developed its own yield model for the five reservoirs in the Newport News Waterworks system to estimate the probabilities of satisfying various levels of demand in all years, not just the drought of record. The IWR panel's supply forecast is a probability distribution of the full range of yields, from lowest to highest, so that the risk assessment can consider all combinations of supply and demand.

Therefore, the IWR panel reports on the percentage of risk that the supply will be inadequate, showing the probable difference between future water needs and future water supply – not just the safe or minimum supply. Figure 1 shows the risk that supply will be inadequate in each of the forecast years with no additional water supply under two assumptions; (1) 33% dead storage and no drought curtailments, and (2) 20% dead storage with drought curtailments. This analysis considers the worst drought in the twentieth century, as Virginia rules require. The risk percentages shown capture the full range of probable demand and supply, not just point estimates. As in their previous report, the IWR panel again pointed out that the FEIS estimate of safe yield of the system was based on a higher level of dead storage space (33%) than used in previous studies.

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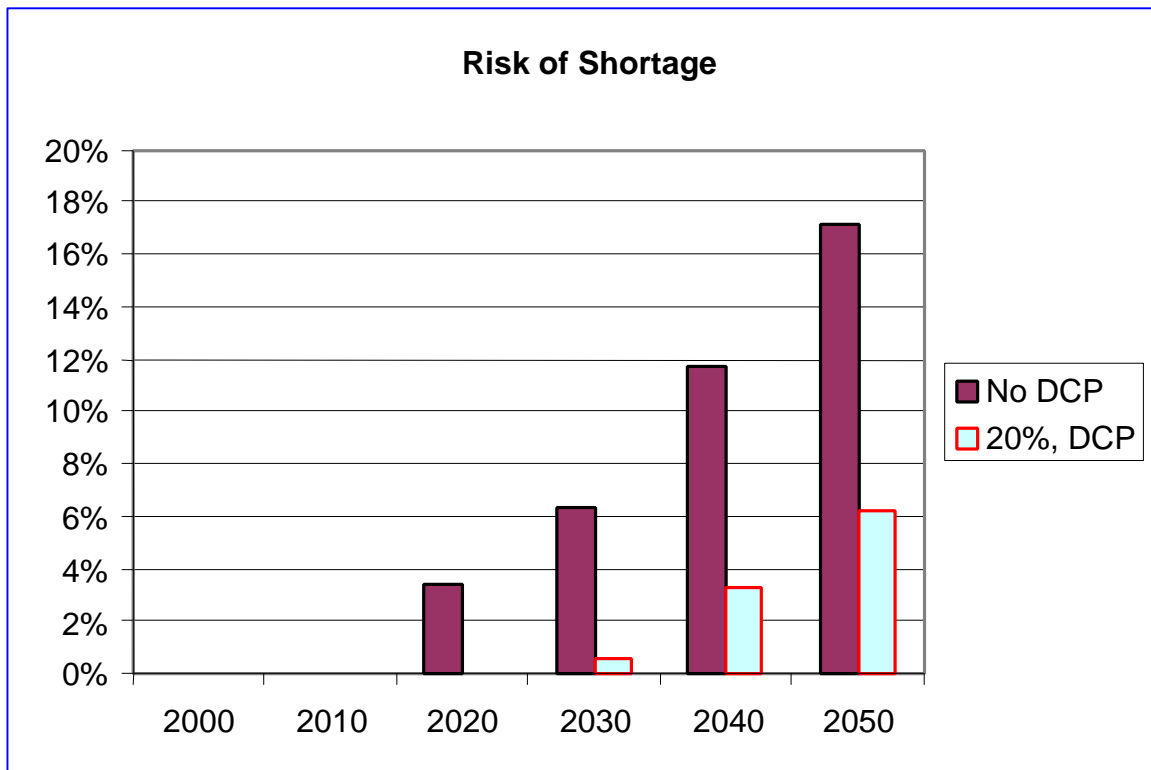


Figure 1. Probability That The Existing Water Supply Will Be Inadequate
(DCP = drought curtailment plan, 20% = 20% dead storage)

The November 2000 HDR report concluded that the region will need more water by 2010, based on Newport News Waterworks' use of 33% dead storage, and the Virginia Department of Health's rule that utilities not rely on drought curtailments to assess the adequacy of their supplies. Based on those two assumptions, the panel estimated that there is no risk of shortage through 2015 with existing supplies. The panel estimated that the region will need an additional 11 mgd of water supply by 2020 in order to have a zero risk of shortage.

The Virginia Department of Health has agreed to a much lower dead storage for existing reservoirs than the 33% used in the HDR calculation. Also, the City of Newport News has a drought contingency plan and has used drought curtailments. Therefore, the IWR panel considered HDR's assumptions on dead storage and drought curtailment to be at least arguable, so they also calculated shortfall probabilities assuming 20% dead storage and the use of drought curtailments. Based on these assumptions, both of which have been used in actual practice, the IWR panel estimated that there is no risk of shortage through 2025 with existing supplies.

(1) Drought Curtailment: Drought planning is the process of identifying an array of drought management measures, usually organized into several stages of increasing stringency; and defining trigger points that determine when each stage will be activated and inactivated. Sooner or later, every utility is faced with a potential deficit and must take various actions to prevent system failure. The deficit

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may arise from meteorological drought, from a contamination episode, or from pipeline or equipment failure. The actions taken in these circumstances – ranging from water use reductions to augmentation of existing supply capacity to emergency supply arrangements – are known as drought management measures. The Newport News Waterworks drought curtailment plan (DCP) provides for three tiers (stages) including voluntary measures (Tier 1) and a range of mandatory measures (Tiers 2 and 3) with specific triggers for starting and ending the curtailments.

For many years, water supply planners calculated future infrastructure needs by comparing forecast unrestricted water use to water availability under design drought conditions (usually the “drought of record”) with an unknown but small probability of recurrence. Assuming that the water use forecast and the hydrologic assumptions proved accurate, the result was a water supply system that would require drought management measures very rarely during the forecast period (only for events more severe than the design drought). However, as hydrologic modeling, water use forecasting, and risk analysis methods improved, it became clear that planning on the basis of an arbitrary reliability level risks substantial excess costs. Setting the reliability level too high requires the utility to provide costly and possibly environmentally damaging supply works that will rarely be needed. Setting the reliability level too low means that costly, inconvenient and potentially disruptive drought management measures will be implemented too frequently. The IWR panel believes that a preferable planning criterion is to minimize the total costs of supply and demand measures, achieving a balanced strategy of capacity additions and reasonable use of drought management, known as Strategic Trigger Planning.

Some drought management measures, when implemented occasionally, involve little more than mild to moderate costs and inconvenience for water users. These include the familiar, relatively low-impact restrictions on outdoor water use, voluntary reductions, increased recycling, accelerated leakage control programs, etc. The availability of such measures in time of drought will often produce significant and highly cost-effective reductions in long-term supply requirements. Typically, these measures are acceptable to the public (unless implemented too frequently) and less costly than the incremental supply capacity that would be required to avoid their use. The IWR panel believes that low-impact drought measures should always be considered in determining supply requirements, whether implemented through voluntary action or by regulation, because it so often makes economic and environmental sense to reduce use during occasional dry periods.

Since there were no benefit-cost analyses of drought curtailments in the HDR studies, the IWR panel used the existing Newport News drought plan and the panel’s safe yield model to determine how drought plans would extend the reliability of this water system. The panel found that the Newport News plan can increase the reliability of the current water system. In other words, if water use is curtailed occasionally during moderate to severe droughts, the system can support larger average demands without ever experiencing a shortfall. However, the already low outdoor water use in this region means that drought curtailment will not have the dramatic effect that it has in other regions of the country that rely on treated water for most domestic irrigation.

The panel then re-ran the simulation applying drought curtailments according to the rules and expected savings described in the Newport News drought contingency plan and allowed the reservoirs to drop to 20% dead storage to quantify the reduction in risk that would occur if the operators drew the reservoirs down more during droughts, recognizing that there could be additional water treatment costs. The panel also counted the frequency in which drought curtailments would be imposed.

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The frequency of drought curtailments for the 20%, DCP scenario is shown in Table 1, below. Between 2020 and 2030, the frequency of voluntary drought declarations would reach a level that might cause some public pressure for additional supplies. In 2020, voluntary lawn sprinkling bans would be required in 4 years out of every 100. By 2030, mandatory bans would be imposed in 2 years out of every 100, but voluntary bans would be imposed in 15 years out of every 100. The voluntary percentage is high, but probably could be adjusted lower with a refinement of the triggers used. However, if future water use were to attain the high end of the expected range, supply would be inadequate even with these plans in place. This creates the small risk shown in Figure 1 for 2030 for the 20%, DCP scenario. By 2040 even with drought curtailment there is 50/50 chance of a 4% risk of shortfall. The panel estimated that the region will need an additional 8 mgd of water supply by 2030 in order to have a zero risk of shortage.

Table 1 Frequency at Which Each Tier of Drought Curtailments are Imposed						
	2000	2010	2020	2030	2040	2050
Tier 1	0.03%	0.108%	3.4%	14.5%	45.9%	62.9%
Tier 2	0.00%	0.004%	1.3%	1.9%	4.0%	13.8%
Tier 3	0.00%	0.000%	0.5%	1.2%	0.0%	1.3%

(2) James City County Desalination Plant: The IWR panel also believes that since James City County has shown its intent to develop a desalinated groundwater plant, it should be considered in the District's alternatives analysis. The City of Newport News argues that the net contribution of the new plant to the yield of the system would only be 2 mgd, rather than 5 to 6 mgd as reported by James City County, because some of the freshwater wells would be abandoned. The panel's analysis of groundwater studies suggests that the current aquifer yields can be sustained, therefore, for planning purposes the expected yield of the desalination plant should be estimated to be between 2 and 6 mgd. Yield from this source would mean that the region will have adequate supply with zero risk of shortage for a few years beyond the dates noted above. **In their comments on the RROD, the City of Newport News stated that James City County had applied for an increase in its groundwater permit from 4.6 to 6.2 mgd, and that this permit covered all extractions, fresh and saline, and thus will provide a net increase of only 1.6 mgd. IWR accepted this argument to the extent that it replaces the lower bound of the 2 to 6 mgd estimate with 1.6 mgd.**

(3) Risk of Shortfall with Additional Supply: Because of the uncertainty regarding the net yield of the other supply sources, particularly the proposed James City County Desalination Plant, the panel estimated how various levels of additional supply would affect the risk of shortfall. Figures 2 and 3 show the risk that supply will be inadequate with additional supplies of 5, 10, 15, 20, 25 mgd under the two operational assumptions. Supply is considered inadequate in any year where water use is not satisfied in any month. Again, the analysis considers the worst drought in the twentieth century, as Virginia rules require and the risk percentages capture the full range of probable demand and supply, not just point estimates.

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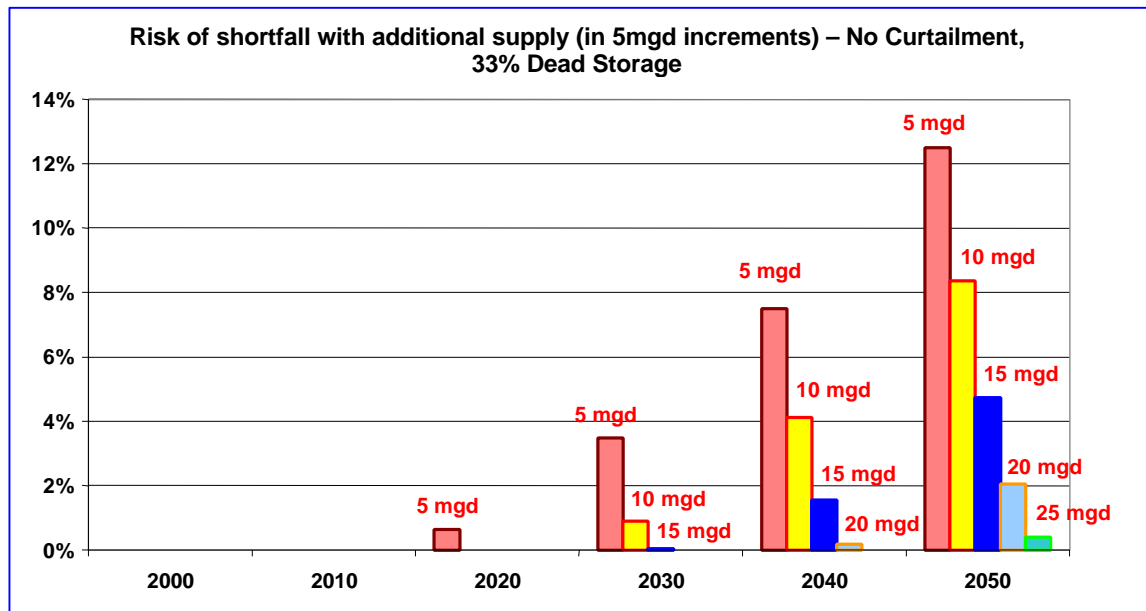


Figure 2. Probability That Water Supply Will Be Inadequate If Supplemented By New Supply, Assuming No Curtailment During Drought And 33% Dead Storage

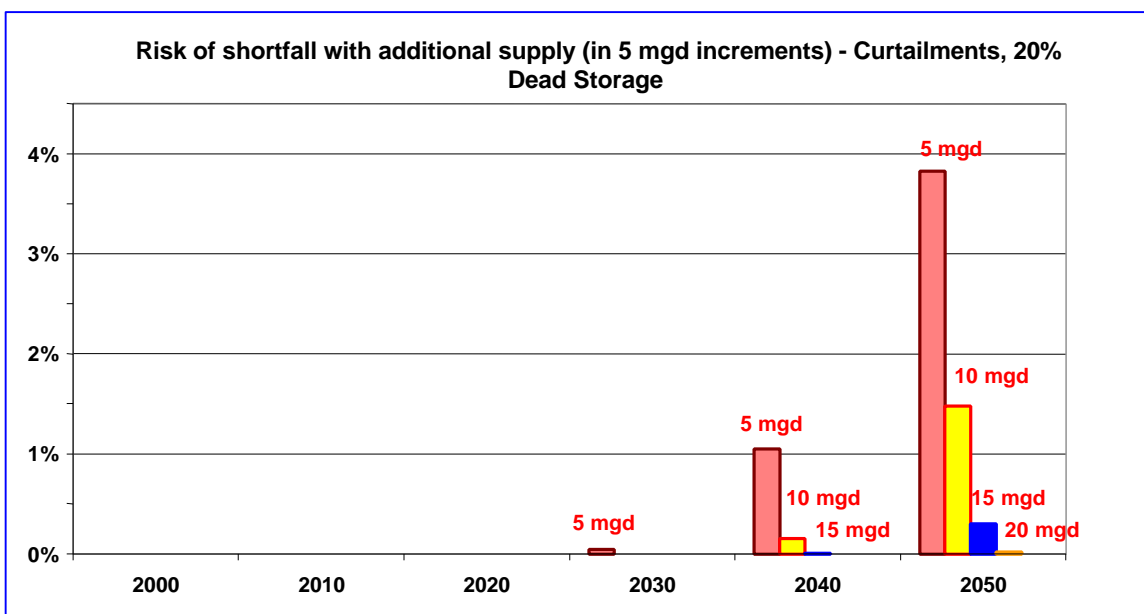


Figure 3. Probability That Water Supply Will Be Inadequate If Supplemented By New Supply, Assuming Curtailment During Drought And 20% Dead Storage

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(4) Additional Supplies Needed to Eliminate Risk: To reduce the risk to zero, the following amounts of additional water supply would be needed as shown in Table 2 and Figure 4 below:

Table 2 Additional supply needed to eliminate risk of shortage

	2000	2010	2020	2030	2040	2050
No DCP, 33%	0	0	11	17	25	32
DCP, 20%	0	0	0	8	16	23

(DCP = drought curtailment plan, 33% = 33% dead storage, 20% = 20% dead storage)

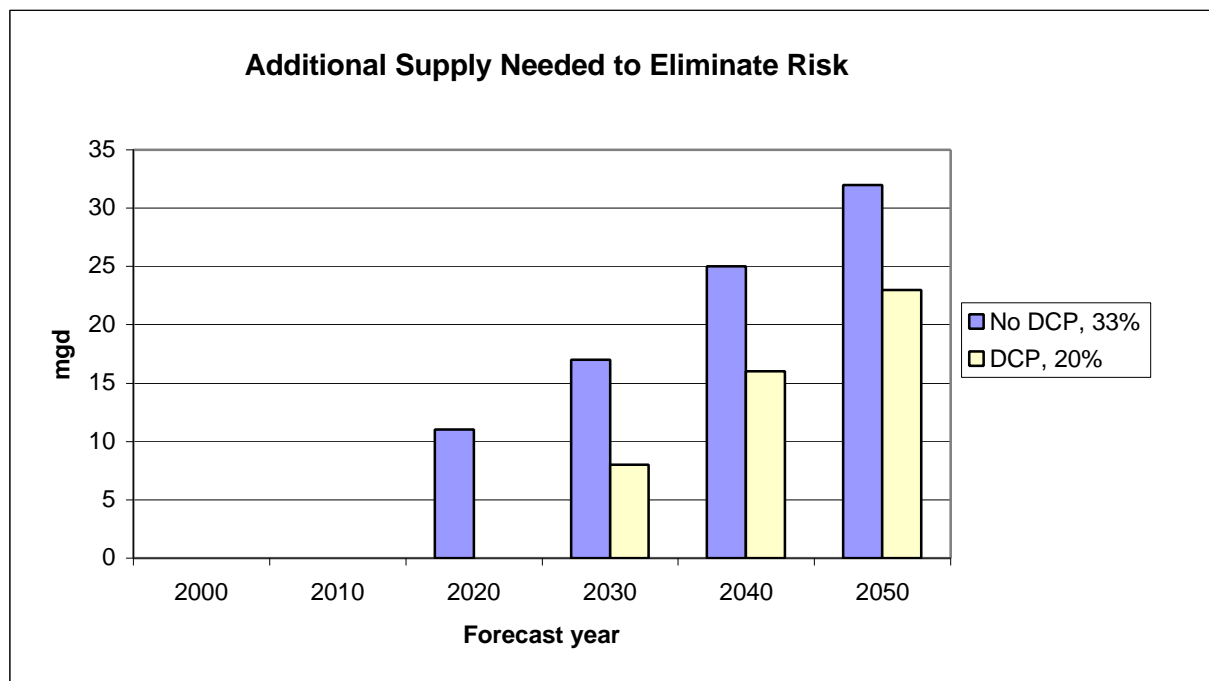


Figure 4. The amount of additional supply needed for zero risk of shortages

(DCP = drought curtailment plan, 33% = 33% dead storage, 20% = 20% dead storage)

These amounts correspond to the upper limit of Figure ES-1 in the HDR Report. These values are derived from a risk assessment that assigned a range to each water use category to capture the uncertainty in forecasts. Zero risk means that this amount of water would satisfy the highest levels of water use in those ranges under any hydrologic conditions that had been experienced in the twentieth century.

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The panel found that if no new water sources are provided, the RRWSG service area will experience an increasing risk of deficit over the next 50 years. The IWR panel's results show that the RRWSG has demonstrated a need for some additional water supply in order to drop their risk of shortage to zero sometime between 2015 and 2030 depending on the operational criteria applied. Assuming that water use is not curtailed during droughts and reservoirs are not allowed to go below 33% full, this risk will not be perceptible before about 2015, and is likely to become clearly perceptible sometime after 2020. Based on the use of 20% dead storage and occasional drought curtailments, both of which Newport News Waterworks has used in actual practice, the panel believes the region will need an additional 8 mgd of water supply by about 2030 in order to eliminate all risk of shortage.

- No DCP, 33% Dead Storage: Unless the region suffers a drought more severe than any recorded in the twentieth century, the RRWSG would have enough water through about 2015 even without using drought curtailment or dipping into the lower third of their reservoir storage. The risk of shortage is as follows:

There is no risk of shortage through 2015 with existing supplies.

There is a less than 4% risk of a shortage by 2020. The maximum expected deficit by 2020 is

11 mgd (i.e., if water use is the highest expected, if groundwater yields are the lowest expected, and if there is a recurrence of the worst drought of the twentieth century).

There is about a 7% risk of a shortage by 2030. The maximum expected deficit by 2030 is 17 mgd.

There is about a 12% risk of a shortage by 2040. The maximum expected deficit by 2040 is 25 mgd.

There is about a 17% risk of a shortage by 2050. The maximum expected deficit by 2050 is 32 mgd.

- DCP, 20% Dead Storage: If drought curtailments are used and reservoirs are allowed on occasion to drop to 20%, then the region would have enough water through about 2025. Under these conditions, the risk of shortage is as follows:

There is no risk of shortage through 2025 with existing supplies.

There is a less than 1% risk of a shortage by 2030. The maximum expected deficit by 2030 is 8 mgd.

There is a less than 4% risk of a shortage by 2040. The maximum expected deficit by 2040 is 16 mgd.

There is a 6% risk of a shortage by 2050. The maximum expected deficit by 2050 is 23 mgd.

- James City County Groundwater: Since James City County has shown its intent to develop a desalinated groundwater plant, an expected yield of between 1.6 and 6 mgd should be considered as available water supply in the alternatives analysis. Any additional yield from this source would mean that the region will have adequate supply for a few years beyond the dates noted above for these two scenarios and the water would be supplied where it is apt to be needed most. Adding as little as 5 mgd of new supply drops the risk of shortage by 2020 to about 1%. Each additional 5 mgd supply increment significantly decreases the risk of future shortage. Combined with drought curtailments and 20% dead storage, as little as one 5 mgd supply increment (i.e., taking into consideration the James City County groundwater well) would reduce the risk of shortage to close to zero as late as the year 2030.

(5) Dead Storage and Safe Yield of the Newport News System: Both in the FEIS and the HDR report, the estimate of safe yield of the Newport News Waterworks system was based on a higher level of dead storage space in their existing reservoirs than used in previous studies or required by the Virginia

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Department of Health. This further limits the effectiveness of their drought contingency plans. Safe yield is generally calculated assuming reservoir capacity is diminished by dead storage. This space can be filled with years of sedimentation, and it can be more difficult or more expensive to treat water in the lowest elevations. The Department of Health has previously allowed the safe yield of the Newport News Waterworks system to be based on the physically unavailable storage of about 12%. (According to all reports, 10-12% of the reservoir capacity could not be used, at least not without extraordinary measures.) The Newport News system has about 13 billion gallons of storage, and Big Bethel and Waller Mill Reservoirs add another 2 billion gallons.

IWR developed their own safe yield models to determine the sensitivity of safe yield to the specification of dead storage volumes shown in Table 3 below. This includes safe yield from all existing reservoirs.

Table 3	
Dead Storage	IWR estimate of Safe Yield, all reservoirs
12%	70.8 mgd
20%	65.6 mgd
25%	62.2 mgd
33%	56.7 mgd

} 5.5 mgd } 8.9 mgd } 14.1 mgd

By using 33% dead storage to calculate safe yield of their system, Newport News Waterworks has discounted a significant amount of storage volume in their existing reservoirs that is available for water supply. By using 25% dead storage, an additional 5.5 mgd of existing storage within the system is available as safe yield. By using 20% dead storage, an additional 8.9 mgd of existing storage is available as safe yield. Using 12% dead storage, an additional 14.1 mgd of existing storage is available as safe yield. Newport News Waterworks' proposal to cease withdrawals at 33% of total storage volume is arbitrarily and unnecessarily conservative, and unreasonably inflates their apparent deficit. Based on comments from the City of Newport News and others, I have modified my calculation of the safe yield benefit that could be realized from dead storage in the system. This discussion appears in Section (8) below.

Newport News Waterworks reported experiencing water quality problems when Diascund Creek Reservoir was drawn down to between 20 and 25% of total storage in 1983 and 1984. However, they did not report on the costs or the difficulties involved in treating this water. Even though it might be more difficult or more expensive to treat water in the lowest portions of these reservoirs, it would undoubtedly be less costly than providing a new water source, especially considering how infrequently it would be necessary. Furthermore, maintenance dredging of accumulated sediments in the bottom of the reservoirs could restore some of the storage volume that is lost over time to sedimentation and reduce the costs and difficulty of treatment.

(6) Need for Additional Water Supply: The Corps' Institute for Water Resources concluded that unless the region suffers a drought more severe than any recorded in the twentieth century, the RRWSG has enough water through about 2015 even without using drought curtailment or dipping into the lower third of their existing reservoir storage. Therefore, there is no risk of shortage through 2015 with existing supplies. The IWR panel estimated that using 33% dead storage and no drought curtailment, the region will need more water beyond 2015 in order to have a zero risk of shortage. By 2020, there is a less than

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4% risk of a maximum 11 mgd shortage if water use is the highest expected, groundwater yields are the lowest expected, and there is a recurrence of the worst drought of the twentieth century. By 2030, the risk is about 7% for a maximum 17 mgd shortage. The risk increases to 12% for a maximum shortage of 25 mgd by 2040. In the year 2050, there is about a 17% risk of a maximum shortage of 32 mgd of water. The risk of shortage means the risk of needing to use drought curtailment, not that the region would run out of water.

Newport News Waterworks would use drought curtailment if needed during a drought as they have in the past and as any prudent utility would. Building the King William Reservoir would likely push the need for doing so again far into the future (barring emergencies), but at a significant environmental, social, and economic cost. I acknowledge the Virginia Department of Health's policy that utilities should not include drought curtailment when calculating the capacity of their supply systems, and that this policy would preclude Newport News from using IWR's drought curtailment scenario (as discussed above) to determine the 'official,' or rated capacity of their system. Although I did not rely on the drought curtailment scenario to justify my findings, I cannot ignore the reality that drought curtailment would be invoked if needed and would extend the capacity of Newport News' current system.

Referring to Figure 2, it can be seen that if Newport News Waterworks would use the existing reservoir storage volume of 5.5 mgd (at 25%), 8.9 mgd (at 20%) and 14.1 mgd (at 12%) in their calculation of safe yield, they would not need that same amount of safe yield from another future source, including additional storage space in a new reservoir. Utilizing as little as the 5.5 mgd of dead storage between 33% and 25% to calculate safe yield would reduce the risk of shortage to 1% by 2020, to less than 4% by 2030, to less than 8% by 2040, and to 13% by 2050. If Newport News Waterworks would utilize the 8.9 mgd of reservoir dead storage between 33% and 20% to calculate safe yield, there would be no risk of shortage by 2020, the risk of shortage would be reduced to less than 2% by 2030, to less than 4% by 2040, and to 8% by 2050. By using the 14.1 mgd of dead storage between 33% and 12% in their calculation of safe yield, there would be a less than 1% risk of shortage by 2030, a less than 2% shortage by 2040 and a less than 5% shortage by 2050. **Based on comments from the City of Newport News and others, I have modified my calculation of the safe yield benefit that could be realized from dead storage in the system, which affects the projected availability of existing supplies. This discussion appears in Section (8) below.**

I also believe that the 1.6 to 6 mgd of water from James City County's proposed groundwater desalination plant should be considered as a reasonably foreseeable future water supply and taken into consideration in the region's water supply planning. I also believe that the RRWSG has underestimated the expected yield of the aquifer. Yield from the James City County desalination plant would postpone the need by a few additional years depending on how much of the potential 6 mgd yield is actually realized.

Therefore, I have determined that the RRWSG will have no risk of shortage through the year 2015 with existing supplies. If water use is the highest expected, and if groundwater yields are the lowest expected, and if there is a recurrence of the worst drought of the twentieth century, there is a less than 4% risk of a maximum 11 mgd shortage by 2020. The maximum potential 11 mgd shortage calculated for 2020 could be satisfied by using the existing reservoir storage volume and the yield from the James City County desalination plant, and the region would have only a very small risk of shortage by 2030. Each additional 5 mgd supply increment (from some other sources) significantly decreases the risk of future shortage. I find that the RRWSG would not need any new water supply, let alone a new reservoir until after about

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2030. Based on comments from the City of Newport News and others, I have modified my calculation of the safe yield benefit that could be realized from dead storage in the system, which affects the projected availability of existing supplies. This discussion appears in Section (8) below.

Determining the best time to begin construction on a new water project is a matter of judgment, involving consideration of risk of shortage, project costs, financial impacts, shortage costs, hardships to users and numerous uncertainties with respect to alternative strategies. The IWR panel believes that by using Strategic Trigger Planning as their planning criterion, the RRWSG can achieve a balanced strategy of capacity additions and reasonable use of drought management.

(7) Water Needs for National Defense: Fort Eustis, and the Yorktown Naval Weapons Station rely on Newport News Waterworks for all of their water supplies. Langley Air Force Base and Fort Monroe obtain their water supplies from the Big Bethel Reservoir, but rely on Newport News Waterworks for emergency supplies. Each command has clarified their current and projected water needs based on the effects of military downsizing and base closures. There is evidence that the base closure and realignment has not had a major impact on the Peninsula except for a slight increase in military related employment.

In a letter dated 17 December 1998, City of Newport News Mayor Joe S. Frank wrote to General Richard E. Hawley, Commander, Air Combat Command, Langley Air Force Base, soliciting the support of Langley Air Force Base for the City's proposed King William Reservoir project. Mayor Frank's letter stated "We know that to support further consolidation of facilities to the Peninsula or to accommodate a military mobilization in response to a national security threat, requires that an adequate water supply infrastructure be in place."...and..."To ensure that the needs of our local military installations are not overlooked in the decision-making, I ask that you convey to Colonel Carroll your thoughts on the importance of a reliable municipal water system to your mission at Langley Air Force Base."

In a letter dated 14 January 1999, Brigadier General Earnest Robbins, II, the Civil Engineer for Langley Air Force Air Combat Command wrote to me and attached a copy of Mayor Frank's letter to General Hawley. Brigadier General Robbins stated that Big Bethel Reservoir is operated and maintained by Fort Monroe's Department of Public Works which reported that the Big Bethel Reservoir will continue to serve Langley AFB's needs. He indicated that the City of Newport News' municipal water system would be relied upon in case of emergencies or when additional water supply is required. He projected no significant changes within the foreseeable future in the base's current average water consumption, and stated that "Any project necessary to ensure reliable water supply to Langley AFB while satisfying all environmental requirements is in the best interest of the Air Force."

The following comments were also received from commands at Fort Eustis, the Yorktown Naval Weapons Station and Fort Monroe:

Brigadier General Gilbert Harper, Commander of the U. S. Army Transportation Center at Fort Eustis stated in a letter dated 13 January 1999 that he expects his facility to show a gradual increase in military and civilian employment due to consolidations of other facilities caused by military downsizing. He stated that "A reliable source of water is absolutely critical to mission execution at Fort Eustis."

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J. H. Cospier II of the U. S. Naval Weapons Station at Yorktown indicated in a letter dated 18 February 1999 that he did not anticipate any major growth of the facility, although there are some vacant facilities that could be filled by tenants. He also stated that “A reliable municipal water service is critical to the operation of WPNSTA Yorktown and to Navy families residing in the area.”

In a letter dated 27 January 1999, Colonel Bobby A. Little, Post Commander of Fort Monroe, indicated that Fort Monroe possesses its own capability for satisfying the water needs of the installation, but routinely require an alternative source of water when minor problems develop in their treatment plant and distribution system. He indicated that Fort Monroe and Langley Air Force Base will likely not suffer much from reduction in personnel and base closures, as they are major commands. He stated “If future demographic requirements justify the added capability obtained from the King William Reservoir project, Fort Monroe supports the initiative and highly encourages your approval.”

The RRWSG’s November 2000 HDR report predicted a total military demand of 4.03 mgd in 2000, 4.01 mgd in 2010, 4.00 mgd in 2020, 3.98 mgd in 2030, 3.97 mgd in 2040 and 3.96 mgd in 2050. They attributed the decrease in future military water usage over time to on-base conservation, primarily the replacement of older fixtures. While each of these commands has a general need for an adequate and reliable water supply in order to fulfill their mission, they do not specifically need the King William Reservoir project for national defense. Any alternative that would reliably supply water to these commands would satisfy their needs.

(8) Comments Received on the RROD Regarding the Extent of Public and Private Need:
Comments on the issue of need for additional water supply have been grouped and addressed by subject. Comments were submitted by the following:

City of Newport News (on behalf of RRWSG), Comments to Norfolk District, U. S. COE
Recommended Record of Decision (RROD): March 20, 2001 and IWR Special Study:
March 1, 2001, Historical/Cultural Resources and Environmental Justice, “Water Need
and Project Alternatives” and “General Appendices” 4 May 2001
James S. Gilmore III, Governor of Virginia
Virginia Department of Environmental Quality
Virginia Department of Health
HDR Engineering, Inc.
Camp Dresser & McKee
Donald Phillips, Ph.D., West Point Hunt Club, Inc.
Michael Siegel and Dr. Thomas Muller, of Public and Environmental Finance Associates
Southern Environmental Law Center
Sierra Club, Virginia Chapter
James Ryan, Troutman Sanders Mays & Valentine
Donald Rice (Newport News Waterworks employee)
David Morris (Newport News Waterworks Planning and Programs Manager)
Ed Maroney (Newport News City Manager)
Newport News Councilwoman Mamye BaCote
Newport News Councilman Herbert H. Bateman, Jr.
New Kent County Board of Supervisors
U.S. Geological Survey

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(a) **Reservoir Dead Storage and Safe Yield:** The City of Newport News acknowledged that some storage from the lower reaches of the existing reservoirs may be safe to treat and stated that they could treat water down to 30% or 25% during rare events. However, they reported only a very modest increase in safe yield from changing this operating assumption. Newport News stated that data presented in their comments, in the EIS document, and in the HDR report support their finding that reducing the dead storage to 25% or even 20% would result in only a 1 to 2 mgd increase in safe yield. Newport News also stated their belief that there were significant accuracy issues relating to the computation of safe yield presented in the IWR analysis.

After the RROD was published, the City of Newport News asked IWR for the monthly outputs from the IWR safe yield model. Then, in their comments on the RROD, Newport News and Camp Dresser & McKee pointed out that the IWR model assumes that pumping from the Chickahominy River is limited only by the requirement that 10 cfs be left in the river, and assumes that local drainage (water flowing, not pumped) into the reservoirs is 59% of the Chickahominy flow. Newport News and the Virginia Department of Environmental Quality state that as a condition of their 1975 Virginia permit for the project, pumping cannot exceed 40 mgd (the IWR model often violates this limit); and local drainage should be 36.2% of the Chickahominy flow (IWR overestimates reservoir inflows by 60%). They state that reallocation of dead storage under the IWR assumptions leads to a greater safe yield than the system can actually provide. DEQ stated “Obviously, there is some potential gain that could be realized by reallocating dead storage. However, the gain is not nearly as large as the RROD claims.” The IWR panel had not been aware of the 40 mgd limit in their earlier analyses, and they agree that imposing this limit explains much of the difference between the RRWSG and IWR models. The IWR panel has modified part of their conclusions on the issue of dead storage based on comments received on the RROD and subsequent research and analysis.

The City of Newport News stated that the Newport News Waterworks withdrawal permit from the state does not allow withdrawals greater than 40 mgd. However, in their comments on the RROD, they confirmed that they have a physical system capacity of 61 mgd. They stated “Even if, by some means, the pumping limitation was relaxed, the configuration of the pumps and pipelines limit the maximum flow that can be transferred from the river to approximately 61 mgd.” In their comments on the RROD and the IWR report, the Virginia DEQ provided a copy of a 1975 letter from the Virginia Office of the Governor to the City of Newport News authorizing construction of the Little Creek Reservoir and permitting the withdrawal of water from the Chickahominy River at Walkers Dam. The permit was conditioned to provide that discharges from the reservoir on Little Creek are at least 0.14 cfs (the estimated 7-day low flow with a 10-year return period), and that pumping from the Chickahominy River would not exceed 40 million gallons per day.

However, in a 9 January 1992 letter to William H. Poore, Jr., Chief of the Regulatory Branch of the Norfolk District, Charlie Crowder, Director of Newport News Waterworks, requested the Corps’ concurrence with his determination that no new federal authorization was needed for the proposed rehabilitation and expansion of the City’s Chickahominy Pumping Station. In this letter, he referenced the 1975 Corps permit that authorized the pump station, but not the 1975 Virginia permit, for the original pumping station. The 1975 Corps permit required that a minimum of 10 cfs flow downstream from Chickahominy Reservoir be maintained at all times. Mr. Crowder stated that in the 1975 Corps permit “The Corps imposed no limitation on the volume of water that could be withdrawn from the Chickahominy Reservoir”...and ... “As part of the process of replacing the pumps, the capacity of the station will be increased by about 20 mgd. With the ability to withdraw additional water from the

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Chickahominy Reservoir during high flows, the safe yield of the City's water will be increased. These additional withdrawals can and will be made in full compliance with the four permit conditions listed above."

In a letter dated 27 February 1992, the Norfolk District confirmed that as the proposed pump replacement would not involve any new intake pipes or other work in waters of the U. S., no permit would be required; but recommended that before they proceeded with the project, the City should obtain all required state and local authorizations. The District noted that should the proposed additional withdrawals result in any violation of the four special conditions of the 1975 Corps permit, the permit could be suspended. Therefore, according to Mr. Crowder's statements, Newport News Waterworks should physically be able to withdraw 61 mgd from the Chickahominy River and increase the safe yield of the system without violating the 10 cfs flow requirement. However, I recognize that pumping 61 mgd of water from the Chickahominy River would decrease average flows, as Newport News Waterworks would pump to the 10 cfs limit more often.

A Chickahominy River Pumping Capacity Increase (Alternative 17) that would involve increasing the pumping capacity of the existing Newport News Waterworks Chickahominy River pumping station from 40 mgd to 61 mgd was one of the alternatives considered in the FEIS. This alternative was rejected early in the review process since the RRWSG reported that this alternative would provide only about 0.2 mgd of additional safe yield because it would likely trigger a more restrictive MIF requirement for the Chickahominy River for streamflow protection. The need for a more restrictive MIF requirement was not investigated, only conjectured.

From the City's comments on the RROD, it appears that these modifications to the pumping capacity have been completed and Newport News Waterworks already has the ability to pump more than 40 mgd from the Chickahominy River (up to 61 mgd). It is unclear why Newport News Waterworks would incur the cost of making the pump station enhancements unless they had confidence that state authorization to use the extra capacity would be forthcoming. Mr. Crowder made no mention of the 1975 state permit, and neither DEQ nor the applicant referenced the proposed modifications outlined in the 1992 letter to the Norfolk District.

In a recent telephone conversation with DEQ personnel, my staff confirmed that the City of Newport News had not requested authorization from the State for the pump station modifications or for a potential withdrawal increase. Furthermore, the District was informed that such authorization would not likely be forthcoming, as it would be in violation of state law which they said was cited in the 1975 letter from the state. My staff requested that DEQ specify which state law would be violated, however, DEQ staff did not provide this information and instead referred only to the 1975 letter. (Personal communication 8 June 2001.) The 1975 letter from the Governor of Virginia cites Section 15.1 - 37.1 of the Code of Virginia 1950, as amended, as the basis of the authorization for the original dam and water withdrawal. There is no reference to pumping limits in this Section of the Virginia Code. As with any other authorization or permit, specific conditions may be modified. There is no reason to believe that a periodic increase in the withdrawal rate, when needed, should not be acceptable to the state, provided minimum instream flow requirements are met. Such a permit modification would usually be conducted by DEQ. According to Mr. Crowder's statements in 1992, the 61 mgd withdrawal would not violate the existing minimum instream flow requirements.

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Local flows - IWR had estimated that local inflows would be 58% of the Chickahominy flows because that is the average used by Newport News in two water balance tests of its reservoir system lasting two months each. Camp Dresser & McKee (CDM) acknowledged the 58% ratio in those two tests, but said that the safe yield should be calculated based on long-term ratios. They recommended a 36.2% factor for the entire RRWSG system based on the fact that the ratio of the drainage areas was 36% and over a long period of time the flows per square mile of drainage areas were about the same. CDM recommended a 30.3% ratio if just the Newport News reservoirs were being modeled. This is a common way of estimating ungauged flows in similar nearby basins and CDM provided additional statistical tests to support this. The flow records from the contributing streams are incomplete, and the flows these streams produce per square mile of drainage area varies considerably, but having received these comments, IWR used a 30.3% factor in re-evaluating the yields from use of additional dead storage in order to eliminate differences other than the pumping limits from its conclusions.

Figures F-1 and F-2 illustrate the results of IWR calculations that confirm the Regional Raw Water Study Group's assertion that using more dead storage will not increase safe yield substantially if the maximum pumping rate is limited to 40 mgd. With local flows at 30.3% and pumping limited to 40 mgd, IWR was able to replicate the response of the Newport News system. As these figures show, increasing the average demand from 57.5 to 58.3 mgd while limiting pumping to 40 mgd causes the reservoir to fall to zero (and below the level at which water can be physically removed). However, raising the maximum pumping limit to 61 mgd while preserving the 10 cfs flow-by rule allows a 67.7 mgd demand to be met with a minimum reservoir level of 25%, 10 mgd more than when pumping is limited to 40 mgd for the 1960 to 1970 time period. However, the higher pumping is not as effective in other patterns of drought, so the increase in safe yield over the entire period of record (1920-1999) is only about 5.2 mgd.

Figure F-1 illustrates storage in Newport News reservoirs from January 1960 to December 1970. Maximum pumping is limited to 40 mgd. Supplying an average demand of 57.5 mgd draws the reservoirs down to about 20% of capacity. This graph was prepared by IWR but is essentially identical to the graph prepared by the Regional Raw Water Study Group, page 10 of their 4 May 2001 response to the IWR Special Study. Table F-1 below shows system inputs and outputs and is similar to the table shown on page 12 of the RRWSG report.

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Figure F-1. Newport News System, IWR Simulation, 40 MGD Pump Limit, 57.5 mgd demand (19% minimum storage)

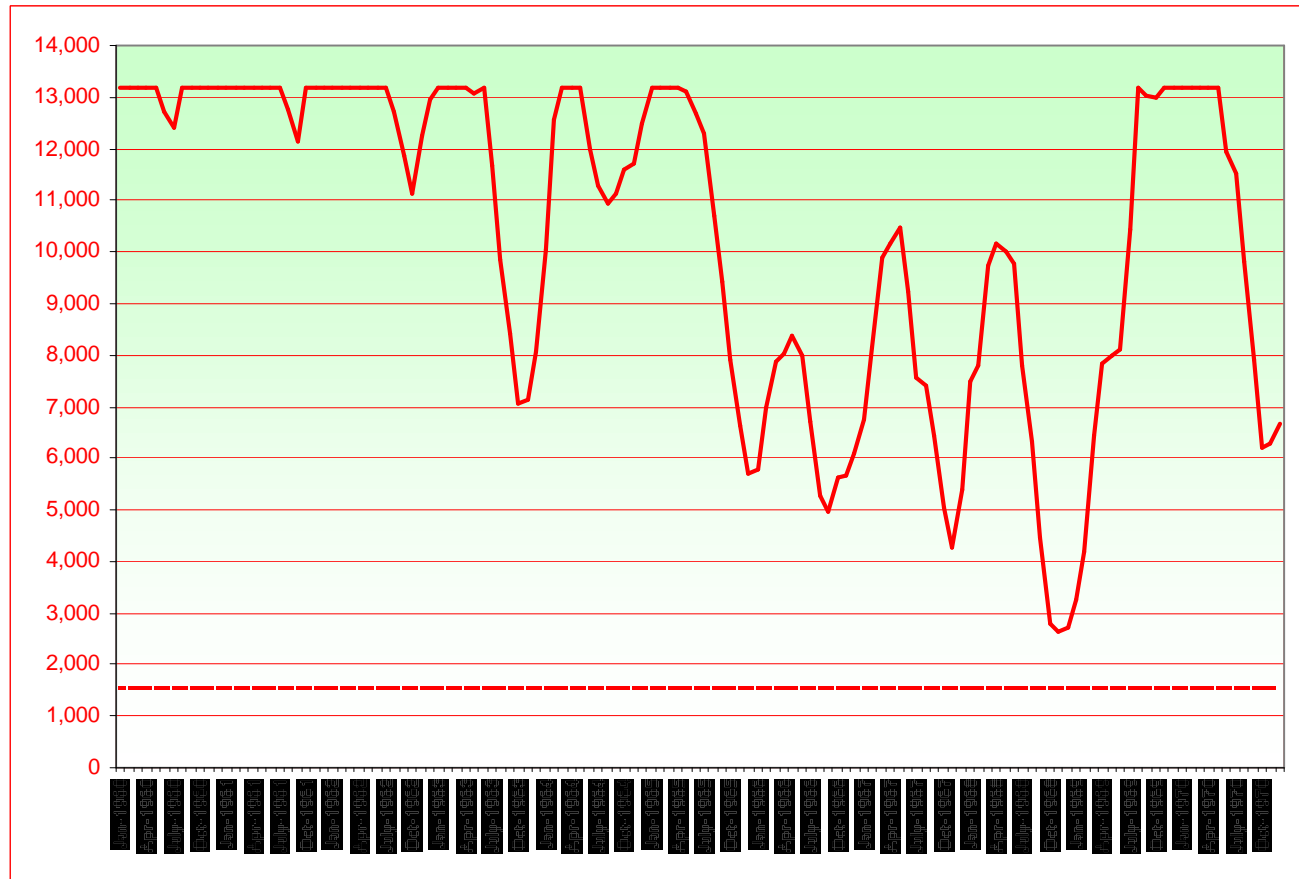


Table F-1

Model Characteristic	Volume in Millions of Gallons		Relative % of Total Losses
Starting Storage (100%)	13,200	May-65	
Ending Storage (%)	2,630	Nov-68	
Change in Storage	10,570	(over 1309 days)	14%
Chickahominy Pumping	38,728		50%
Watershed Natural Inflows	28,851		37%
Total Inflow	67,579		
Average Water Demand	75,998	(58.1mgd)	
Other losses (evap, spill)	2,151		
TOTAL losses	78,149		100%
Losses-Inflow	10,570		

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Figure F-2 shows a second simulation of storage in Newport News reservoirs from January 1960 to December 1970. Maximum pumping is limited to 40 mgd, as in Figure F-1, but average demand is increased to 58.3 mgd, which draws the reservoirs down to about 12% of capacity. This confirms the calculations shown in Table 1, page 8 of the RRWSG report that safe yield increases by less than 1 mgd when dead storage is reduced from 20% to 12%.

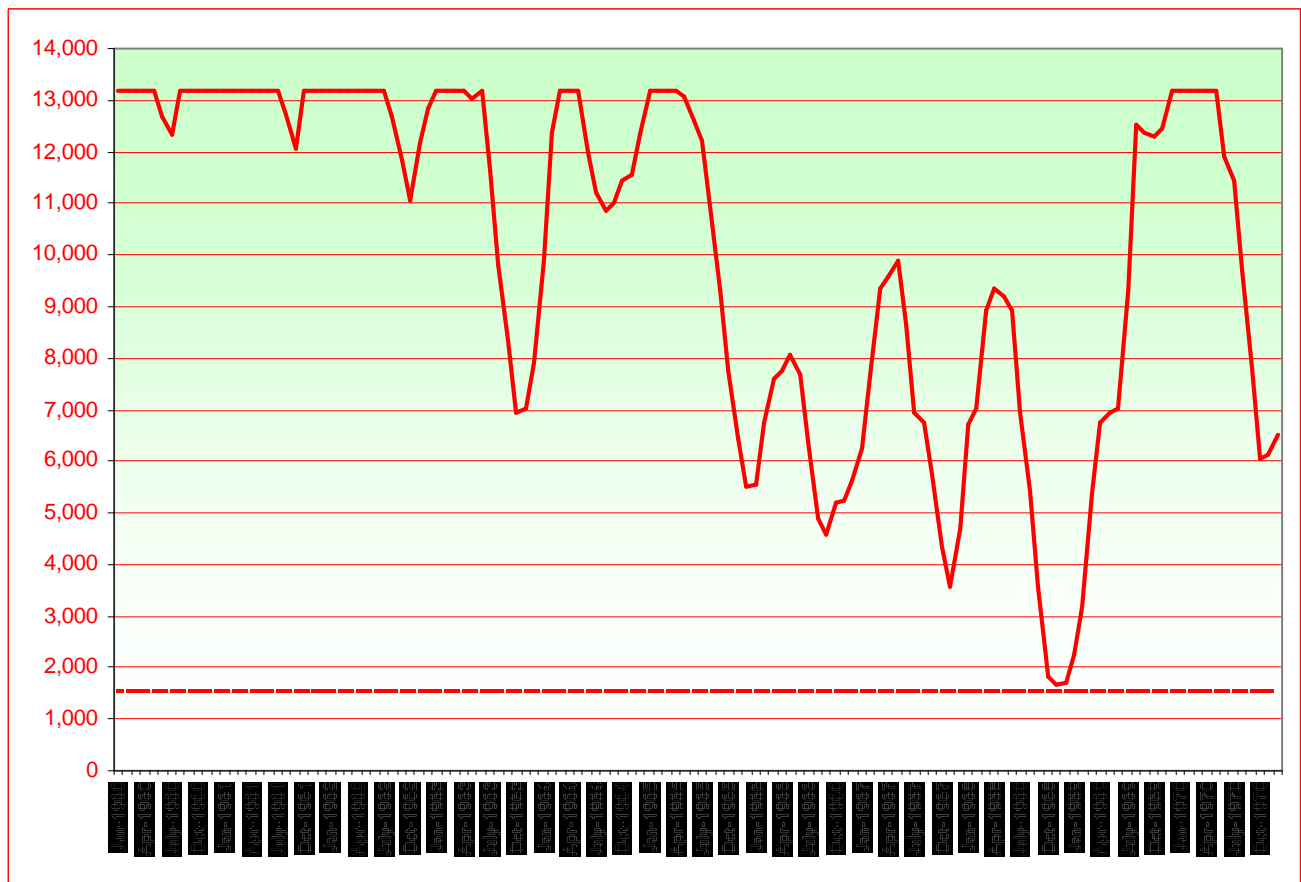


Figure F-2. Newport News System, IWR Simulation, 40 MGD Pump Limit, 58.3 mgd demand (12% minimum storage)

Figure F-3 illustrates the results of IWR calculations that show that increasing the maximum pumping limit to 61 mgd increases the yield by 10 mgd during the 1960 to 1970 time period. The increase in safe yield when applied to all reservoirs and the entire period of record (1920 to 1999) is not as large because the critical drought becomes the drought of the 1930's. Over the entire period of record, the increase would be more modest, about 5.2 mgd for all reservoirs. Figure F-3 shows a third simulation of storage in Newport News reservoirs from January 1960 to December 1970. This time the maximum pumping limit is increased to 61 mgd, the physical capacity of the system. Average demand has been increased to 67.7 mgd, which draws the reservoirs down to about 25% of capacity. The City of Newport News has said that they prefer a 33% limit on dead storage to avoid water quality issues, but that the reservoirs

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could be drawn down to 25% on rare occasions and the water could be safely treated. Although the Virginia Department of Health has allowed the reservoirs to be drawn down to 11.8%, which is the practical physical limitation of the system, this lower limit was not used in the IWR calculation.

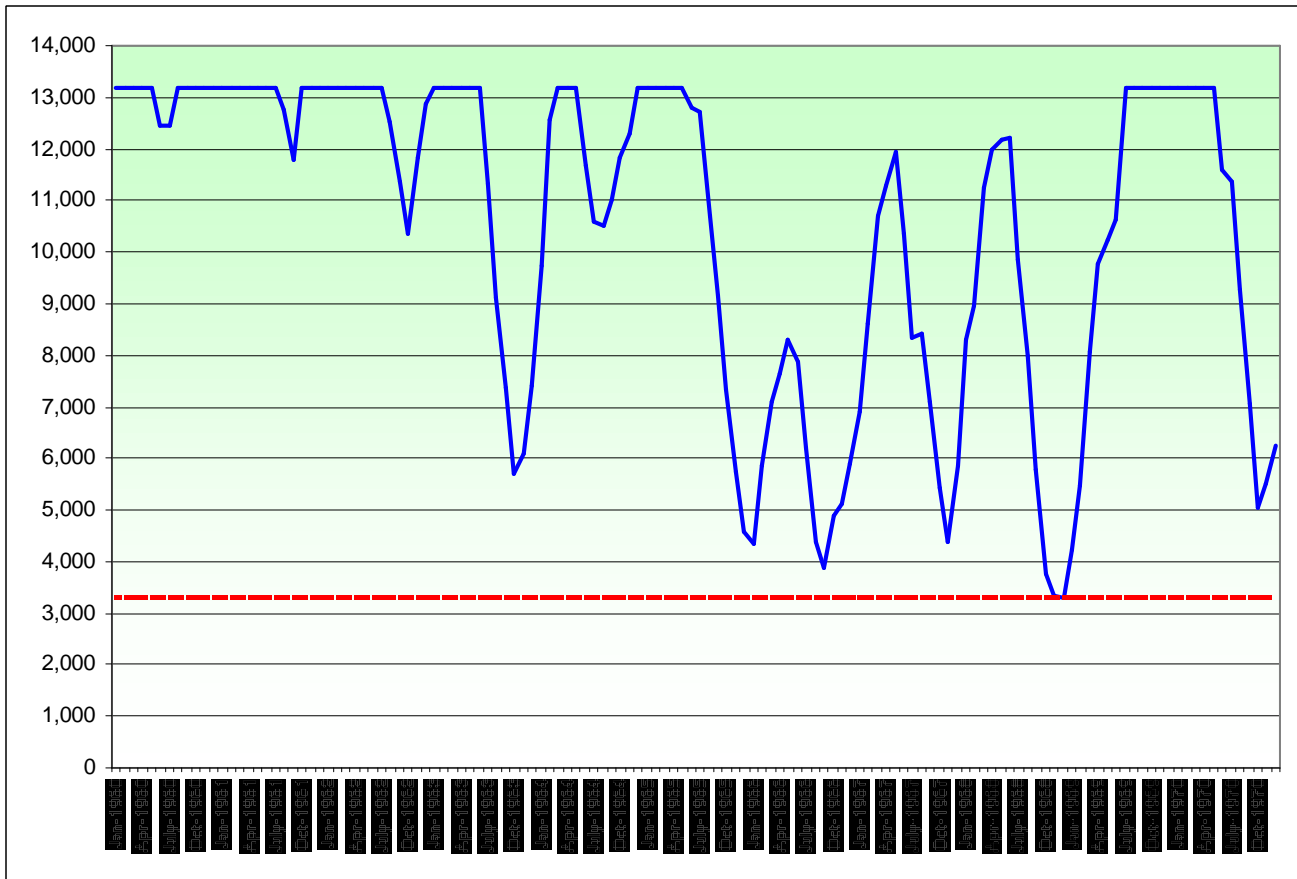


Figure F-3. Newport News System, IWR Simulation, 61 MGD Pump Limit, 67.7 mgd demand (25% minimum storage)

These figures indicate that a total of 5.2 mgd could be obtained from the existing system if the DEQ permit were modified to allow pumping to 61 mgd from the Chickahominy River (which may already be the existing capacity of the pump station). Although flows in the Chickahominy do not drop below 10 cfs because of pumping in any of these simulations (the natural flow is sometimes less than 10 cfs), the increase in pumping from 40 to 61 mgd would reduce the average flow-by. Alternative 17 was eliminated from further consideration in the EIS for other reasons before the environmental impacts associated with the increase were fully evaluated. Should increasing the withdrawal to 61 mgd be considered by the City of Newport News, the environmental impacts would have to be assessed. The basic conclusion of the IWR analysis have not been challenged and I maintain my determination that the RRWSG will have no risk of shortage through 2015 as stated in the RROD. However, I acknowledge that the additional safe

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yield benefit of utilizing dead storage would not be as great without increasing pumping from the Chickahominy River. Considering the yield from all reservoirs and preserving the current 10 cfs flowby rule, the increases in safe yield compared to the base case for Chickahominy River pumping would be:

40 mgd, 33% dead storage (base case) = 0
40 mgd limit, 25% dead storage = 1.6 mgd
61 mgd limit, 25% dead storage = 5.2 + 1.6 mgd = 6.8 mgd

Utilizing the maximum capacity of the existing pump station and 25% dead storage, the risk of shortage would be postponed until at least 2020 with the additional 6.8 mgd of safe yield. The risk of shortage would be postponed even further (until at least 2022) with the 1.6 mgd minimum expected yield increase from the James City County desalination plant. These dates are estimated based on the highest expected need and lowest expected yield from groundwater, although both are very unlikely. Should demand not attain the maximum predicted levels or if groundwater wells provide more than the minimum expected, the need for additional water supply would be postponed ever further into the future. Furthermore, as stated in the RROD, Newport News Waterworks will likely use drought curtailment during a drought as they have in the past and doing so would add a few more mgd to the yield of the system.

The City of Newport News and others commented that IWR had ignored water quality concerns with water drawn from the lower parts of the reservoir. Water quality had not been ignored in the IWR review. The 2001 IWR Special Study stated "Because the Newport Waterworks reported experiencing significant water quality problems when Diascund Creek Reservoir was drawn down to between 20 and 25% of total storage in 1983 and 1984, IWR developed its base estimates of the risk of shortfall using the 33% dead storage. There were no reports on the costs or the difficulties involved in treating this water, so the Panel also calculated the risk of shortage using less dead storage so that the water supply effects could be compared to the costs of water treatment. However, we are not aware of any estimates of the additional treatment costs for using water from the lower portion of the reservoirs." In its most recent comments, the City of Newport News did provide information on the nature of the water quality concerns, but no analysis of what was done in the 1980s to treat the water or how much it had cost. The city did state that water withdrawn down to the 25% level was probably safe to treat.

Dr. Donald Phillips commented that Newport News Waterworks is converting from chlorination to ozonation for water purification. He believes this has removed the most significant water quality issue in pumping from the lower elevations of the reservoirs. Previously, the FEIS indicated that because the free chlorine used for water sterilization could react with dissolved or suspended organic material, drawing down its reservoirs introduced a danger of halocarbon contamination. Ozonation also leads to increasing the oxygen content of eutrophic water and elimination of objectionable odor, taste, and color of stale water. IWR recognizes that ozonation can effectively address some of these issues, but it may not eliminate all use of chlorine. There are also by-products from ozonation, especially if the water is high in bromides. IWR continues to believe that the costs of treating water in those fairly rare instances when reservoirs are drawn down should be determined and compared to the resulting increase in safe yield. For the purposes of their response to the RROD, IWR has assessed the safe yield at a dead storage of 25%, a point where all parties seem to agree the water quality issues could be resolved.

(b) Yield from Groundwater, and from the Proposed James City County Groundwater Desalination Plant: HDR believes that the IWR panel took liberty in adding supply based on future development of wells and systems, because this assumes that the aquifers are adequate to support the

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additional development, and disregards the fact that the HDR evaluation was based on current system and not additional supplies. The City of Newport News commented that the IWR panel underplayed the stress on the aquifers.

IWR's basic conclusion on when additional water supply would be needed assumed no new wells and the minimum yield from existing wells. IWR's estimate of the risk of shortage after 2015 was reduced very slightly by their assumption that the maximum possible yield from groundwater could be greater than today's yield. IWR also did not include any yield from the proposed James City County Groundwater Desalination Plant in their conclusion that the region would not need water until 2015. IWR stated that the estimated yield for this plant had been variously reported as from 2 to 6 mgd and agreed with HDR that the plant was likely to be built.

In their comments on the RROD, the City of Newport News stated that James City County had applied for an increase in its groundwater permit from 4.6 to 6.2 mgd, and that this permit covered all extractions, fresh and saline, and thus will provide a net increase of only 1.6 mgd. IWR accepted this argument to the extent that it replaces the lower bound of the 2-6 mgd estimate with 1.6 mgd. If Newport News now agrees that the new desalting plant will add 1.6 mgd, then this would add a few years to the IWR estimate of 2015 as the date when additional water supplies would be needed.

Newport News does not assert that the groundwater permit would not be increased again in the future so as to recapture the freshwater yield that James City County currently has. Furthermore, HDR did not suggest that the current yields from the Chickahominy-Piney Point aquifer are unsustainable. In fact, they have assumed that additional demands will be placed on the aquifer. These additional demands could be limited under regulations developed by the state (VAC 25-600-20). IWR has not changed the upper limit of the yield for the new plant on the assumption that the state could permit James City County to increase its fresh groundwater withdrawals in the future enough to restore the "lost" freshwater capacity. However, neither the low nor high estimate of the new plant was used in the IWR panel's calculation of the risk of shortage.

(c) The Use of 19th Century Droughts: The City of Newport News commented that IWR's use of only 20th century flows to calculate the safe yield was a "fallacy" and that responsible planning requires all historic droughts to be considered. The IWR panel report stated "The flows from the 1850s can be used as the basis for planning for extraordinary droughts, but should not be used in a calculation of safe yield." IWR believes that all parties have agreed that the streamflows used by IWR to calculate safe yield are those required by the state of Virginia. The Virginia standard is typical in its use of the drought of record, and conservative in that it does not allow the use of demand curtailment during drought.

IWR was the first to suggest that the RRWSG should plan for future droughts worse than any on record, and they still believe that is prudent. The U. S. Geological Survey has essentially endorsed IWR's position in their report and comment letter in response to the RROD. However, IWR has consistently said that they would expect the response to such droughts to rely on demand reduction if the costs of supplying 100% of demands were high. The USGS report does not recommend that communities expand their water supplies to meet droughts more severe than any in the historical record, only that they consider such droughts in their planning.

Camp Dresser & McKee raised several issues regarding the IWR assessment and analysis of 19th century rainfall data, the development of streamflows from rainfall and the assessment of the frequency of the

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most severe drought in the extended streamflow record. The IWR panel agrees, and had acknowledged in their report that the estimate of recurrence intervals beyond fifty years is problematic. IWR contends that while this assessment is reasonable, it is also arguable. Since IWR concluded that it was reasonable to use the streamflows for planning purposes, and since no one believes that the streamflows should be used to calculate safe yield as required by the state, the differences of opinion on these issues did not affect the IWR conclusions.

(d) Unaccounted for Water: Several commenters took issue with the IWR estimates for unaccounted for water. HDR felt that IWR's rate of 8% was arbitrary (and low). Mr. Michael Siegel and Dr. Thomas Muller, and Dr. Donald Phillips thought the IWR estimate was too high. IWR decreased the estimate they had previously developed for unaccounted for water based on information in the new report prepared by William Maddaus for the RRWSG. In that report, Mr. Maddaus stated that Newport News had lowered the actual unaccounted for water percentage from 11 to 2.8% using public education, improved meter accuracy, reduced system pressure, faster repair of leaks, and the metering of all uses including flushing. This record of low unaccounted for water since publication of the FEIS is strong evidence to support a lower percentage than IWR forecasted, therefore, they feel that their estimates are conservative. With such strong regional data, IWR did not base their estimate on records of unaccounted for water use in other parts of the country.

(e) Risk of Shortage: Camp Dresser & McKee and Newport News commented that a small risk of water supply shortage in any one year could be equated with a greater (cumulative) probability of shortage over a longer period. IWR agreed, and believes that this is another good way to look at risk. It does not change or diminish the basic conclusion of the IWR report as to when water will be needed, but it would add to the characterization of the risks of shortage after that point in time. IWR's finding that no water supply was needed until 2015 is based on maximum demands always being met with the safe yield of the system. Using this strict standard the risk of shortage in any year is zero, therefore, the risk would not accumulate over years. In the future years when IWR did identify a risk based on this standard, they concluded that a need for additional water supply had been demonstrated. Cumulative risks based on HDR's projections would accumulate slightly earlier, since there are small differences in the HDR and IWR demand estimates for those years.

HDR commented that they did not agree with IWR's characterization of HDR's 50.6 to 60.2 yield as a range of system yields. IWR acknowledged that they understand that HDR was referring to the safe yield of the system. This is not a disagreement about analysis, but rather about the presentation of risk results. HDR "agrees with the general approach" IWR used to assess the risk of future water supply shortages but challenged IWR on the dead storage issue, and the extended record. HDR wrote that they strongly believe that IWR is underestimating the actual risk of shortage. IWR believes that their estimate of the risk of shortage discussed above is very conservative and, as explained in their report and above, is not appreciably different from HDR's. IWR does believe that their estimates of the risk of shortage differ more from HDR's later in the forecast period, but are still quite conservative.

(f) Growth Projections: IWR accepted the range of future population produced by the REMI model in the HDR report. Mr. Siegel and Dr. Muller commented that assumptions in the REMI model differ considerably from assumptions made by the Hampton Roads Regional Planning Commission and James City County. Dr. Donald Phillips suggested that the REMI model applied to the region starting in 1970 would have overestimated the actual growth that occurred. IWR agreed that the REMI model

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population projections were higher than other forecasts, but IWR accepted its outputs as reasonable because it is a defensible method and the discrepancies were not significant in the next twenty years.

(g) Percent Area Served: HDR defended its projection that 100% of the region would be served by the RRWSG utilities by 2050, and said that the IWR projection of 98% was unrealistically precise. The RRWSG previously reported lower percentages, and IWR could find no documentation as to why these were increased. The reasons offered by HDR for 100% coverage (such as regulations and population density) were known to the RRWSG when they projected the lower percentages.

Mr. Siegel and Dr. Muller commented that the HDR estimate that 100% of the population will be served by the RRWSG is contradicted by the James City County Comprehensive Plan that specifically precludes the extension of central water services into the areas of the county outside the primary service area. They added that the assumption that all residents will be served by utilities is also at odds with the assumption that a majority of new homes in James City County will be on multi-acre lots, since the unit cost of providing water and sewer to sparsely developed regions is proportionately high. Mr. Siegel and Dr. Muller argue that the previous RRWSG estimate of 94% by 2040 be retained.

Mr. Siegel and Dr. Muller, and Dr. Donald Phillips commented that HDR's assumed 2-acre lots in future James City County homes estimates more outdoor water use, whereas the average home in James City County occupies only a half-acre. IWR believes their estimate of 98% is conservative, and that 100% coverage is unlikely given the semi-rural nature of some of the region. However, it makes no difference in IWR's basic conclusion, since the differences materialize in future years.

(h) Water Price and Use: Mr. Siegel and Dr. Muller commented that demand should be reduced to reflect the doubling of the real price of water. In previous reports, IWR has suggested that generally, a doubling of prices would result in about a 10% decline in municipal water use. Mr. Siegel and Dr. Muller point out that the price of water will double if the King William reservoir is built. HDR agreed that the benefits of conservation should include the opportunity costs avoided. IWR believes that they were conservative in not reducing water use to reflect price, but did not have enough information to project any specific savings.

(i) Military Reserve: IWR accepted the assumption that the region should add 3 mgd to future demands to allow for the possibility of a military buildup. Mr. Siegel and Dr. Muller commented that no such reserve has been included in previous RRWSG reports, and that the amount is entirely speculative – it is unsupported by current military planning, and should at most be included in the uncertainty analysis. They point out that a “reserve” implies it would be available solely to the military, with associated costs paid by the military, but no such agreements are under consideration to their knowledge. IWR considered all these points and believes that the amount is essentially speculative, but not unreasonable. It would be reasonable to include it in the uncertainty analysis, but that would require an equally speculative high and low estimate. IWR decided that HDR's approach was a reasonable way to resolve an issue that cannot be dismissed. Furthermore, IWR feels that their use of HDR's number and method makes IWR's basic conclusion about when additional water will be needed more conservative.

(j) Labor Participation Rates: Mr. Siegel and Dr. Muller commented that HDR projects employment to grow at 1% per year while population grows at only 0.81% per year, thereby steadily increasing the ratio of employment to population, a trend contrary to national projections. They note that the current ratio is high for the region and the percent of the population between the ages of 18 and 65 is

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forecast by the Census Bureau to fall. Accordingly, they argue that commercial water use will be less than forecast by HDR. IWR believes these are reasonable arguments, but the estimating method used by HDR relies on land use, not directly on employment. In any event, Mr. Siegel and Dr. Muller estimate that the difference amounts to less than 1 mgd by 2050, so this would not affect IWR's basic conclusions.

(k) Non-Military Government Water Use: Mr. Siegel and Dr. Muller commented that non-military government water use was estimated using the per-acre water use for non-retail commercial, but HDR projected government employment to grow at a much lower rate than non-retail commercial. They argue that non-military government water use was thus over-estimated and should be adjusted downward. IWR agreed that this is a reasonable argument, but believe that the differences in demand would be small and mostly in the later forecast years.

(l) Industrial Water Use: Mr. Siegel and Dr. Muller commented that the general assumption of increased productivity (and hence increased water use) in the industrial water use sector should not be applied to the ship building industry, which employs more than half the workers in this sector and had lower productivity in 1997 (latest data) than in 1992. They also pointed out that the analysis only considers the production side, not sales. They contend that future water use assumes that three times as many ships will be produced without any assessment of whether there is a market for so many ships. IWR considers both of these points reasonable, and in fact argued the second point in earlier reports. IWR has also consistently argued that future industrial water use is the most difficult to predict. IWR accepted the HDR approach as reasonable because the forecast for 2040 water use fell in the middle of IWR's previous "center of opinion" forecast for industrial water use.

(m) Population and Residential Demand: Mr. Siegel and Dr. Muller commented that the HDR assessment is biased towards a higher population than previous forecasts - about 1 to 2% higher in 2010, and greater in future forecast years. They also point out that more of the population is forecast to be in James City and York Counties, significantly higher than in previous studies. Mr. Siegel and Dr. Muller argue that this raises overall residential water use because water use in new homes in these counties is assumed to be higher than in new homes in other parts of the region due to their larger forecasted lot sizes and associated higher outdoor water use.

Mr. Siegel and Dr. Muller, and Dr. Donald Phillips commented that HDR assumed growth in these counties that would actually be restricted by land use, floodplain and wetlands regulations. Dr. Phillips presented an extensive discussion of land use restrictions stating his belief that land use restrictions will either limit population or increase the density of single-family housing, either of which would reduce water use. Mr. Siegel and Dr. Muller argued that the cumulative effect of HDR's assumptions about growth and percent of area served would overestimate residential water use by 4.0 to 6.0 mgd by 2050. IWR could not resolve this discrepancy during the RROD review period, but recommended that these concerns be addressed in reviewing water use estimates for the latter part of the forecast period. IWR commented, however, that they would expect the effects before 2020 to be less significant.

(n) Range of Uncertainty Analysis: Mr. Siegel and Dr. Muller argued that the Monte Carlo analysis is meaningless since it is centered on fixed point estimates that are biased towards the high side. IWR based their conclusion that the region did not need water until 2015 on the assumption that the region would simultaneously experience the highest demand and the lowest (safe) yield of the supply system. These upper limits are arguable, and they might be lowered if the fixed point estimates were

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lowered. Doing so would extend the estimated date additional supplies were needed. Again, the IWR panel feels that they have erred on the side of conservatism in this reasonable difference of opinion.

(o) IWR's Standard of Proof: Mr. David Morris, Planning and Programs Manager for Newport News Waterworks, commented that the "Norfolk District must have given IWR a special, private instruction to use a higher standard" in assessing the adequacy of the water needs assessment. I have never given IWR any such instruction and IWR confirmed that they did not receive any such instruction from my staff.

Mr. Donald Rice, a Newport News Waterworks employee claims that "When one of the IWR panelist discovered how the (IWR) report was being misused, he immediately withdrew his name from the report and refunded his \$2,500 fee. His integrity is refreshing." The City of Newport News made a similar allegation during the December 1999 meeting between Newport News and the IWR panel. The City of Newport News' verbatim record shows that Mr. Roland Steiner's role was clarified for all present (including Mr. Rice) as follows: Mr. Steiner was appointed as the fourth member of the IWR panel to be the "tie breaker" in the event that the other panel members did not agree on any issue. The three panel members were in complete agreement, and Mr. Steiner's services were not required. As he had never been sent payment, it was not necessary for him to refund the agreed upon fee for his services. All three panel members confirmed at the meeting that they were in complete agreement and fully supported the findings of the IWR report. Mr. Steiner has never reported any dissatisfaction with the report to IWR.

(p) The Use of Realistic Evaporation Rates, Full Reservoir Capacity, and Drought Plans: Dr. Donald Phillips commented that the conclusions of the RRWD would have been stronger had IWR used a more realistic reservoir evaporation model, full reservoir capacity, and state mandated drought curtailment plans. The use of full reservoir capacity (dead storage) is addressed above. Dr. Phillips stated that the Virginia DEQ was critical of the RRWSG evaporation model in a letter to the Norfolk District in 1994. Dr. Phillips believes that consideration of evaporation is not applicable to an area affected by the humidity of the Chesapeake Bay and major tidal rivers. Dr. Phillips also commented that IWR was unaware of the State of Virginia's drought curtailment requirements in the 401 permit for the reservoir project.

IWR did not challenge the evaporation model. There is some evidence that it may overstate the amount of evaporation, but it is not conclusive. In its water system water balance tests of 1986 and 1988, Newport News estimated a net loss of 39 million gallons (October 1 to November 30, 1986) and 87 million gallons (August 1 to September 30, 1988). The evaporation model used in the RRWSG and IWR safe yield models assumes a net loss of 150 million gallons for August-September (with reservoirs full) and 134 million gallons in October-November (reservoirs full). In the 1986 test, the reservoirs were about $\frac{3}{4}$ full, therefore, an evaporation of about 100 million gallons would have been calculated, a difference of 61 million gallons or about 2 mgd. In the 1988 test, the safe yield models would have calculated a net evaporation of 116 million gallons, a difference of about 29 million gallons or 1 mgd. But it is not surprising to find a difference between actual net evaporation for a specific calendar month and an assumed evaporation rate for every occurrence of that calendar month throughout the years.

The IWR analysis of drought curtailment was based on the existing system and the existing drought response plans. Using 33% dead storage, the use of the Newport News drought contingency plans described in the FEIS increases safe yield by 2 mgd. This is consistent with estimates previously provided by the RRWSG.

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HDR commented that Virginia water supply planning guidelines do not allow consideration of drought curtailment. IWR has acknowledged this, and did not use drought curtailment to support its basic conclusion on when additional water supplies would be needed.

Dr. Phillips concluded that the safe yield of the existing system is 87.8 mgd, based on the sum of HDR's estimate of total safe yield (67.7 mgd), plus 6 mgd from the proposed James City County desalination project, and 14.1 mgd additional yield from using 12%, rather than 33% dead storage, and notes that this yield would be further increased by the use of drought contingency plans. IWR believes that the James City County plant will add from 1.6 to 6 mgd, and that using additional dead storage could add another 4 mgd. As previously discussed on page 31 of RROD, drought curtailment measures were not used to calculate safe yield, however, I believe a prudent utility would use drought curtailment during droughts. Newport News' current drought response plan would increase the safe yield by about 2 mgd under demand conditions expected in the near future.

(q) Using Increased Groundwater Withdrawals to Meet Future Demands: Dr. Donald Phillips commented that IWR concluded that pumping from the Chickahominy-Piney Point aquifer could be increased by 50%. He reported "There is no reason to assume that water utilization from the Potomac Aquifer, with reverse osmosis demineralization, could not be expanded 100% beyond the existing Newport News 5.7 mgd and the planned JCSA 6 mgd system. Together, these sources would yield at least an additional 15 mgd of supply."

IWR did increase the maximum likely yield from the James City Service Authority system; HDR had estimated that the yield would be from 2.3 to 4.9 mgd, while IWR said it should be 2.3 to 6.3 mgd. The lower limit (2.3) was used in IWR's basic conclusion. The higher range was used in the Monte Carlo analysis and slightly reduced the need for surface water supply. IWR's adjustment was based on the Malcolm Pirnie analysis that showed 40% increases in pumping from existing wells in the Chickahominy-Piney Point aquifer could be sustained. IWR did not speculate on the potential for additional desalting plants, and cannot comment on Dr. Phillips statement that there could be greater yield from such plants.

(r) Treatment Losses: Dr. Donald Phillips commented that statements in the FEIS indicated that dewatering solids recovered during treatment would save 2 to 3 mgd, reducing treatment losses to 0.1%, not the 1% used in the HDR report. If the FEIS statement were true, treatment losses would be virtually eliminated. However, IWR believed the 1% factor was reasonable.

(s) Indoor-Outdoor Water Use: Dr. Donald Phillips commented that HDR had apparently derived outdoor water use as the increase in water use during the irrigation season. He believes the seasonal shift could also be caused by seasonal variations in non-residential use, and that actual outdoor water use is less than reported. This may be true, but the estimates for outdoor water use are already very low, and the estimates for per capita indoor water use are reasonable.

(t) Water Conserving Washing Machines: Dr. Donald Phillips pointed out that a Federal rule requires new energy and water efficiency standards in washing machines. He argued that HDR under-forecasted their use because they assumed both kinds of machines would be available. IWR agrees this is a new development that will save more water than predicted by HDR (or IWR in previous reports). Its largest effect will occur later in the forecast period because people will continue to use existing machines until they must be replaced with the water efficient ones.

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(u) Substitution of Federal for State Authority: In a letter dated 2 May 2001, James Ryan of Troutman Sanders Mays & Valentine stated that the RROD improperly substitutes the District's judgment for the Commonwealth's on the issue of how much water Newport News and its partners will need over the planning horizon. He contends that Section 101(g) of the Clean Water Act, as well as many other federal authorities, specify that such need determinations are to be made by State authorities and not the federal government.

Section 404 of the Clean Water Act (CWA) and its implementing regulations charge the Corps of Engineers with evaluating permit applications for the discharge of dredged and fill material into waters of the United States. As part of its public interest review the Corps does by necessity consider issues such as the need for the project. Cases interpreting Section 101(g) have suggested that in cases involving both the State's interest in allocating water and the Corps' interest in administering water and wetland resources, some interference with the State's interests may be unavoidable. See, e.g., Riverside Irrigation District v. Andrews, 758 F.2d 508 (10th Cir. 1985).

(v) Summary and Conclusion on Water Need: IWR's review of the comments on the RROD revealed that while some issues raised by the RRWSG were supported by their analyses, some good arguments were made for and against elements of their analysis. Nevertheless, they feel that their conclusion that the RRWSG would not need additional water supply until 2015 at the earliest was not persuasively challenged. This is primarily because their assessment was conservative and the fact that there is almost no difference between the HDR and IWR assessments in the 2000-2020 period. Newport News and Camp Dresser & McKee raised legitimate criticisms of IWR's conclusion that the need for water could be put off another ten years through the use of more dead storage.

The IWR panel found nothing in the comments on the RROD to change the basic conclusion of their report that the RRWSG has no demonstrated need for additional water supply through 2015. Based on comments from the City of Newport News and others, I have modified my conclusions concerning the increase in safe yield that could be gained from withdrawals from the lower third of the reservoirs. I acknowledge that the additional safe yield benefit of utilizing dead storage would not be as great without increasing pumping from the Chickahominy River. Utilizing the maximum capacity of the existing pump station and 25% dead storage, the risk of shortage would be postponed until at least 2020 with the additional 6.8 mgd of safe yield. The risk of shortage would be postponed even further with the 1.6 mgd minimum expected yield increase from the James City County desalination plant.

IWR believes that their estimate is very conservative, based on the simultaneous application of the most conservative assumptions over which there is no disagreement with the RRWSG:

- Residential water use would reach the highest level in the range of water use forecast
- Commercial water use would reach the highest level in the range of water use forecast
- Industrial water use would reach the highest level in the range of water use forecast
- Federal and military water use would reach the highest level in the range of water use forecast
- Supplemental military water use would reach the estimated 3 mgd by 2010 (IWR accepted the point estimate provided by HDR as a reasonable safety factor)
- Unaccounted for water use would be more than twice the actual current percentage
- Savings from drought contingency plans would not be considered, even though drought contingency plans are in place and would certainly be used to extend system reliability during a drought
- Groundwater would supply the lowest yield from the ranges of expected yields

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- Surface water safe yield would be as defined by Virginia requirements and the use of 33% dead storage in all reservoirs
- Water supplied by the proposed James City County groundwater desalination plant would not be considered, even though the plant will probably be built.

The IWR panel made two assumptions that were less conservative than those made by the RRWSG:

- 98% of the region would be served by utilities by 2050 (RRWSG now assumes 100%)
- Unaccounted for water use would grow to 8% by 2040 (RRWSG assumes 10%)

The IWR panel believes that the percent area served is conservative compared to earlier RRWSG estimates, and the unaccounted for water percentage is more than double the current actual rate. In any event, these two factors have little bearing on the basic IWR conclusion. Accepting these two assumptions would lead to estimates of water use about 5% higher by the middle of the century, but they have little effect on the IWR estimate of water use in 2015.

IWR agreed with many arguments made by Mr. Siegel and Dr. Muller and others who believed the HDR analysis tended to overestimate demand because the analysis was based on:

- Higher than previous population forecasts
- The assumption that demand would not be reduced by price increases
- The assumption that increases in productivity would produce increases in production rather than decreases in employment
- The assumption that the estimated 3 mgd reserved for the military was speculative and should at least be considered uncertain.

IWR did not change its estimate based on these observations, but feels that these points underscore the conservatism of the IWR analysis.

The ultimate conclusion of the IWR study is that the RRWSG has at least 15 years before an additional water supply is needed. In that 15 years, the RRWSG can develop one or more environmentally acceptable options to meet future demand. The RRWSG also has readily available means (using 25% dead storage, the full existing pumping capacity from the Chickahominy with the existing flowby requirement, and the minimum contribution from the new James City County desalination plant) to extend the available water supply until at least 2022. The RRWSG's need for additional water supply is neither immediate nor certain.

The range of forecasted needs for the 50-year planning period must be examined in order to understand the level of conservatism in IWR's estimate that the RRWSG would need additional water supplies by 2015. This is based on the assumption that the greatest forecasted demand in each demand category would occur simultaneously, including the full military demand for 3 mgd, and the demand would not be reduced during drought by response measures in use today. This maximum demand was coupled with the lowest expected groundwater yield, although that combination of events is very unlikely. For comparison, at the other end of the spectrum are circumstances based on the least forecasted water use and the greatest expected groundwater yield, taking the need for a new water supply to 2043, but that combination of events is equally unlikely. Uncertainty regarding these factors obviously plays a dramatic role in how long the existing water supplies will last, and because the extremes are so improbable, the

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date when additional water supplies are needed will almost certainly be much later than 2015 and much earlier than 2043. Nonetheless, the IWR conclusion is based on the most conservative combination of demands and groundwater yields and thus provides an extremely conservative estimate of the amount of time available to secure acceptable supply measures.

Adding increments of additional supply has the effect of pushing back the dates at both ends of the spectrum. For instance, adding 6 mgd yield from the proposed James City County desalination plant would delay the need for additional water supplies until somewhere between 2019 and beyond 2050 allowing the wide range of future demand forecasts to reconcile themselves somewhat without risking a shortage.

8. Views of the District Commander Concerning the Probable Effect of the Proposed Work on:

a. Water Supply:

(1) Regional Raw Water Study Group Area: Newport News Waterworks currently has a system of five reservoirs which provide a total of 12.9 billion gallons (BG) of raw water storage (Diascund Creek Reservoir = 3.49 BG; Skiffes Creek Reservoir = 0.23 BG; Lee Hall Reservoir = 0.88 BG; Harwoods Mill Reservoir = 0.85 BG and Little Creek Reservoir = 7.48 BG). The proposed King William Reservoir would provide an additional 12.2 BG of storage, thereby almost doubling Newport News' water storage capacity. Also, the City of Williamsburg operates the Waller Mill Reservoir (1.42 BG), and the Army at Fort Monroe operates the Big Bethel Reservoir (0.61 BG). Therefore, total reservoir storage for the RRWSG area actually equals 14.96 BG (see Map 2 - Regional Map). Domestic, commercial and industrial wells also provide water for much of James City County and York County. The James City County Board of Directors recently approved a plan to pursue a groundwater desalination facility to provide its own water supply if the Corps permit for the King William Reservoir was not issued by July 2000 and have now contracted for the first production well.

(2) Communities in the Mattaponi and Pamunkey River Watersheds: The applicant's regional water supply plan does not address the water supply needs of communities in the Mattaponi River and Pamunkey River watersheds, aside from the host allowances in the reservoir storage volume for King William County and New Kent County. In Virginia, water is allocated by the state on a **case-by-case** basis. According to DEQ, the state's review takes into account instream and off-stream beneficial uses, the size of the water body, the need for the water, and the juxtaposition and relative size of the withdrawal and the return flow. DEQ stated that if a municipal withdrawal is appropriately sized with respect to the size of the stream, it frequently receives only a limit on the maximum withdrawal. However, without a regional cooperation agreement, it is possible that not all of the needs in a locality will be met by the resources available in that vicinity if they have already been allocated to a previous user. It might be appropriate to develop a plan to protect instream resources in the region similar to the Regional Flow Management Plan developed by the City of Richmond and Henrico County for competing uses of the James River.

King William County is not a member of the RRWSG, but is the host jurisdiction for the King William Reservoir. The host agreement gives King William County the option to reserve up to 3 mgd of the reservoir storage should they ever build the necessary pipeline, treatment plant and distribution system to use it. The King William County Businessmen's Association recently informed the District that according to the Agreement, the County would not only have to purchase the reserved raw water from the

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City of Newport News and construct the pipes, pump stations, treatment plants and distribution systems necessary to obtain the water, but they would also have to pay the City of Newport News a percentage of the total cost of the reservoir project (currently estimated to be approximately \$167.5 million dollars). The Association believes that these costs would prohibit the County from ever being able to take advantage of the water reserved for them.

Likewise, New Kent County is not a member of the RRWSG, but is the host jurisdiction for the pipeline connecting the King William Reservoir to the rest of the Newport News Waterworks system. A similar host agreement between New Kent County and Newport News provides 1 mgd of the reservoir storage for their future use. New Kent County indicated to the District in 1994 that they currently had no plans for using the water reserved for them in the reservoir storage. **In a letter dated 23 April 2001, Julian Lipscomb, Chairman of the New Kent County Board of Supervisors wrote to inform me that the County has since approved the 3,200-acre Kentland Planned Unit Development in the vicinity of the Diascund Reservoir, which is currently served by groundwater sources. He indicated that it would now be beneficial to the County to have the 1 mgd allocated in the reservoir project, as well as any additional water available to assist in removing the demands placed upon the groundwater aquifer by the Kentland Planned Unit Development.**

According to the Final EIS, there are currently no substantial uses of the Mattaponi River basin for water supply. The Year 1990 estimated average withdrawal of water from the Mattaponi River basin was 4.64 mgd (71% is for domestic, commercial and institutional uses; 21% is for irrigation; and 8% is for industrial, manufacturing and mining purposes). Approximately 3.1 mgd of this withdrawal is for consumptive use; that is, the water is not returned to the river. On the other hand, almost all of the 75 mgd withdrawal for the King William Reservoir would be a consumptive use to the Mattaponi River because it would be pumped to the reservoir in the Pamunkey River watershed and then transferred out-of-basin. Only the water discharged as a downstream release from the dam (and potentially the host allowances for New Kent and King William County) would return to the York River system. Furthermore, the users of the water are in the Lower Peninsula area where wastewater discharge would be into the lower York, Chickahominy and James River basins.

The King and Queen County Board of Supervisors is very concerned that the Mattaponi River would not be able to meet their future water supply needs if the RRWSG is allowed to take so much of the water. The proposed 75 mgd withdrawal represents approximately 15 percent of the estimated average annual flow of 484 mgd in the freshwater tidal area of the Mattaponi River at Scotland Landing. While this is a small percentage of the annual flow, the proposed withdrawal could effectively preclude the use of the Mattaponi River as a dependable water source by other jurisdictions and riparian owners (farmers) within the watershed. River water withdrawals must comply with minimum instream flow (MIF) standards imposed by the Virginia Department of Environmental Quality. During seasonal low flow conditions from June through October, the withdrawal schedule using the modified 80% Exceedence MIF could possibly transfer to the Lower Peninsula up to 40% of the total flow at Scotland Landing on a single day. This would be most, if not all of the water that exceeds the minimum instream flow of 114 mgd, leaving little or none for use of Mattaponi watershed residents. Under the less restrictive 40/20 MIF, pumping would be allowed when freshwater flows exceed 99 mgd; therefore, even less would be left for use by Mattaponi watershed residents. The County is also concerned that the encroachment of more saline water in the Mattaponi River could cause salt water intrusion into shallow aquifers especially at West Point.

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The Caroline County Board of Supervisors is also opposed to the King William Reservoir because it would restrict their future use of the Mattaponi River for water supply. They feel they should be allowed to have their “fair share” of the Mattaponi River water. They also point out that the applicant’s determination of Caroline County’s need is based on a study that is more than 10 years old and no longer accurately reflects Caroline County’s consumptive needs since growth has been faster than projected. Caroline County feels that groundwater systems within the County will be inadequate to meet their demand within the next few years and predict that by 2014, they will need their own surface water source to meet their demand. **In his letter of 2 May 2001, DEQ Director, Dennis Treacy assured the District that “There is little chance that a municipal water withdrawal in Caroline County, that would return water largely undiminished in quantity, would be given the same minimum instream flowby conditions as an interbasin transfer.”**

Numerous farmers on the Mattaponi River use river water to irrigate their crops. The RRWSG’s analysis indicated that crops currently grown by these farmers would be tolerant of the small predicted salinity increases brought about by the withdrawal. Therefore, they concluded that there would be no adverse impacts on irrigation as a result of withdrawals. The RRWSG’s analysis is based on the results of the VIMS salinity study which did not consider the cumulative effects of other consumptive uses or the additive effect of the proposed withdrawals with natural, pre-existing salinity fluctuations. The RRWSG’s analysis also did not appear to consider future increases in agricultural irrigation in the Mattaponi watershed.

b. Navigation, Present and Prospective:

(1) Mattaponi River: The Mattaponi River is navigable at its confluence with the York River and for some distance upstream. Based on historical records, the head of navigation for legal purposes is presumed to be the Guinea Bridge in Caroline County. It experiences moderate to heavy recreational use especially during weekends and holidays throughout the summer. The river is approximately 400 feet wide at the mean low water elevation in the vicinity of the proposed intake site. The proposed 180-foot long intake structure would be constructed parallel to the shoreline approximately 125 feet channelward of the mean low water line. A 72-foot long pier with an enclosed boathouse would be constructed adjacent to the intake structure to provide mooring and storage of a boat for use in water quality sampling and screen maintenance. The pier would extend approximately 20 feet channelward of the mean low water line. The intake structure would consist of six T-shaped pipes with a total of twelve screen-covered openings. The structure would be located in approximately 21 to 25 feet of water, providing a minimum of 7 feet of vertical clearance at mean low water. Although recreational craft should not be affected by the intake structure, the intake area would be marked by warning buoys. Sounding data indicate that the remaining navigable portion of the river is approximately 175 feet wide with a minimum depth of -7 feet at mean low water. Therefore, river usage by larger commercial or pleasure craft should not be restricted. The proposed intake structure and pier should not adversely impact navigation in the Mattaponi River.

(2) Cohoke Creek: The proposed reservoir is located in the non-tidal waters of Cohoke Creek, a tributary to the Pamunkey River. Recreational navigation occurs in the 85-acre Cohoke Millpond, an existing impoundment downstream of the proposed dam site, and in the short tidal reach below the Cohoke Millpond Dam adjacent to Route 632, but is not known to exist above the Millpond. The privately owned Cohoke Millpond is currently fed by approximately 16 miles of perennial streams and 14 miles of intermittent streams from the total 17-square mile drainage area. Water levels are maintained by the Cohoke Fishing Club through the use of a gate-controlled spillway, which feeds into a 30-inch culvert

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running under Route 632. Approximately 3,500 gallons of water per minute, or 5 million gallons per day, flows through the culvert into the tidal waters of the Pamunkey River under normal conditions. Average depths throughout the pond during periods of normal elevation are 5 feet. The proposed King William Reservoir dam would affect roughly half of the Cohoke Creek watershed and would reduce the volume of water entering the Millpond by approximately two thirds. This in turn would reduce the existing flow over the spillway to approximately 1,200 gallons per minute under normal conditions. However, this two-thirds reduction in the total water volume is not expected to adversely affect the Club's ability to control water depths or to navigate within the confines of the Millpond during normal conditions. Impacts to navigable capacity would be associated with abnormal drought events, but should be temporary in nature. Therefore, no adverse impacts to navigation in the Millpond are anticipated. No adverse impacts are anticipated to navigation in the Pamunkey River.

c. Flood Height, Drift and Flood Damage Protection:

(1) Mattaponi River: The proposed 75 mgd maximum daily withdrawal represents approximately 15 percent of the estimated 484 mgd average annual flow in the freshwater tidal area of the Mattaponi River at Scotland Landing (river mile 24), but could possibly represent up to 40 percent of the total flow in a single day during the seasonal low flow period. The total freshwater discharge at the mouth of the Mattaponi River is estimated to be 581 mgd. The mean tidal range at Scotland Landing is 3.56 feet. No measurable effects on tidal height or range or flood damage protection are anticipated. Water depths in the Mattaponi River would not be measurably impacted by the proposed withdrawals since the intake would be located in tidal waters.

(2) Cohoke Creek: Cohoke Creek is a tributary to the Pamunkey River. The Cohoke Creek watershed has an estimated drainage area of 17 square miles. The Creek's tributary system consists primarily of non-tidal perennial and intermittent streams. A 100-year old dam near the mouth of Cohoke Creek has created the 85-acre, privately owned Cohoke Millpond. Numerous beaver dams currently exist on approximately 8 miles of the creek above the millpond. No adverse effects on flood height, drift and flood damage protection are anticipated.

d. Erosion or Accretion:

(1) Mattaponi River: The relative elevation of wetlands to the river is maintained when there is a balance between sediment accretion rates and erosion and subsidence rates. Erosion and accretion could result in long-term changes to plant communities. The withdrawal of up to 75 mgd of water from the Mattaponi River would reduce kinetic energy from freshwater flows. This has the potential to alter erosion rates and suspended sediment loads. In their draft plan for monitoring changes to wetlands on the Mattaponi River, Dr. Arlene Darke and Dr. Patrick Megonigal of George Mason University (members of the River Monitoring Team assembled by the District) concluded that these changes would be expected to alter wetland geomorphology and the substrate available for plants, thereby contributing to changes in wetland community composition (see Section 8 k, Monitoring Plan).

Also, the Fish and Wildlife Service and the Virginia Department of Game and Inland Fisheries expressed concern that the proposed intake structure in the Mattaponi River could cause erosion or accretion of the adjacent marshes and potentially eliminate suitable habitat for the sensitive joint-vetch, a federally-listed threatened and state protected plant species. In an attempt to address this issue, the City of Newport News hired a coastal engineer to examine the potential indirect impacts of the intake structure on flow

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velocities and sediment depositional patterns in the Scotland Landing-Garnetts Creek Marsh area. The findings were presented in a September 1996 report entitled "Study of Potential Erosional Impacts of Scotland Landing, Water Intake Structure on Garnetts Creek Marsh, Mattaponi River, Virginia" by Dr. David R. Basco.

Dr. Basco's objective was to analyze the water velocities and sediment transport potential before and after intake construction to determine if a relative change in sediment potential would occur and to predict the extent of expected change in sediment deposition and scour patterns on the nearby marsh geometry. Due to time constraints, the study relied on existing information provided by Malcolm Pirnie, Inc. and a single site visit by Dr. Basco. The study was limited to the area immediately surrounding Garnetts Creek Marsh across from the proposed pump station and the sensitive joint-vetch colony on the south side of the Mattaponi River upstream of the proposed intake. The report stated, "...the increased mean velocities and sediment transport potential are so small that the possibility for excessive erosion of Garnetts Creek marsh and the south-side shore is minimal to non-existent" (emphasis added). Based on the findings of this report, the RRWSG has extrapolated from this statement that "the installation and operation of the intake will not alter any of the river's existing circulation patterns in a manner that would lead to increased erosion along its shoreline."

Dr. Basco's report actually indicates that while erosion would not be expected to be excessive, small changes in flow and circulation would result in erosion and/or accretion of the shoreline. The report's findings were that the proposed intake would reduce the flow cross-sectional area by only 1.1 percent, but would present a blockage to secondary currents across the river bend that would result in a 2 percent increase in sediment transport potential which could enhance sediment settling at Garnetts Creek Marsh. The intake would increase the maximum tidal flood velocity by less than one percent, but would produce a wake region with increased turbulent kinetic energy that would impact the south-side bank both upstream and downstream of the intake structure. Turbulent wake would be created by the ebb currents and the secondary currents near the river bend where the pump station would be located. Sharp surfaces and edges of the intake screen would generate increased levels of turbulent energy when the ebb flows pass the screen, so that turbulence will be transferred downstream and will diffuse vertically to the surface and down to the river bed.

This increased turbulent energy could reach the sensitive joint-vetch area on the south side of the river, especially during elevated water and flood events. The south-side colony, which is subject to natural erosion processes from freshwater flooding events, may have increased levels of turbulence during daily cycles of the flood tide, consequently, increased erosion could occur. The report also indicated that a smaller wake would extend upstream during daily tidal flooding, and the area of turbulence caused by the water intake may reach the mean high waterline in the south-side colony. Dr. Basco noted that existing models could not predict the exact dimensions and energy content of the turbulent wake or what effects this increased turbulence would have on the species. These changes would be permanent and the effects would be continuous and cumulative. Therefore, he recommended monitoring the level of daily flood tide induced wake turbulence upstream, and monitoring of the south-side habitat after intake construction to determine if protective measures would be needed. Dr. Basco also suggested that monitoring after construction was the only way to evaluate the potential sources of erosion impacts. While I believe the potential for turbulence-induced effects would be minor, they cannot be completely discounted.

(2) Outfall on Beaverdam Creek: The applicant proposes to use Beaverdam Creek as an inter-reservoir conveyance channel for water pumped from the King William Reservoir to the Diascund Creek

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Reservoir. The 11.7 mile pipeline would terminate at a pre-cast concrete outfall structure with a 30-foot riprap apron. A 33-foot wide by 3-foot deep trapezoidal discharge channel would be excavated through 150 linear feet of vegetated wetlands to connect the outfall to the main channel of Beaverdam Creek. The outfall would be designed for a maximum discharge flow of 50 mgd (see Map 4 – Aerial Photo of Beaverdam Creek and Diascund Creek Reservoir).

In the RRWSG's original application, the outfall structure for the pumpover was located approximately 1.3 miles upstream of the normal pool elevation of the Diascund Creek Reservoir, in a third order stream segment of Beaverdam Creek on the north side of Interstate 64. Beaverdam Creek flows southward under the 60 to 75-foot wide concrete supported I-64 Bridge. The Diascund Reservoir is located on the south side of the interstate. Normal pool elevation of Diascund Creek Reservoir is 26.0 feet at mean sea level. Elevation of the originally proposed outfall was 35 feet at mean sea level or 9 feet above normal pool elevation of the reservoir. The discharged water would flow through a small perennial low-flow channel for approximately 4,000 feet before entering a channelized portion of the Beaverdam Creek/wetland complex located approximately 500 to 600 feet upstream of the Interstate 64 crossing.

The District staff and the federal advisory agencies expressed concern that stream channel erosion could be significant, even if the released high flows stay within their banks. The U.S. Fish and Wildlife Service commented that repeated peak flows of this magnitude could severely degrade the biological integrity and channel morphology of Beaverdam Creek by causing scouring of the stream channel, channel downcutting, dewatering of the floodplain and channel widening. EPA provided similar comments. The Virginia Department of Game and Inland Fisheries commented that the Final EIS did not evaluate the impact of the increased frequency of high flows in Beaverdam Creek and that it is highly likely that increased flows would increase erosion, especially during periods of high flow. All three agencies recommended that the discharge point on Beaverdam Creek be moved to the Diascund Reservoir.

Based on those concerns, the District recommended that the RRWSG provide an analysis for inclusion in the Final EIS that would fully and completely evaluate the feasibility of extending the pipeline all the way to the receiving reservoir, rather than merely the applicant's previous statement that doing so would be too costly (\$4 million). The RRWSG failed to provide the requested evaluation for the Final EIS; instead they attempted to minimize the potential for erosion by extending the outfall location another 0.5 miles downstream, thereby reducing the impacted section of streambed to 0.8 miles. The RRWSG modified their application in December 1996 to relocate the outfall approximately 3,800 feet downstream to a point which is approximately 1 foot in elevation above the normal pool of Diascund Reservoir. The new location would be approximately 600 feet upstream of the I-64 crossing of Beaverdam Creek. The Fish and Wildlife Service, EPA, the National Marine Fisheries Service and the Virginia Department of Game and Inland Fisheries continued to recommend that the potentially significant adverse impacts to Beaverdam Creek should be avoided by extending the pipeline all the way to the Diascund Reservoir.

(a) Site Conditions of the Relocated Outfall Site: The relocated outfall structure would be situated within a transitional zone between a floodplain forested wetland and a highly diverse, mixed scrub-shrub, emergent and sub-emergent community. Dominant trees include red maple (*Acer rubrum*) and sycamore (*Plantanus occidentalis*). The herbaceous community consists of, in part, various species of smartweeds (*Polygonum* spp.), pondweeds (*Potamogeton* spp.), cut grass (*Leersia* spp.), sedges (*Carex* spp.) woolgrasses (*Scirpus* spp.), cattails (*Typha* spp.) and blueflag (*Iris virginica*). It is anticipated that species composition in the herbaceous layer would be substantially more diverse during the later part of the growing season as non-persistent species emerge. Soils at the site consist of a Johnston mucky loam:

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a coarse-loamy, siliceous, acid, thermic cumulic humaquepts. Johnston soils are very deep and poorly drained which are formed in loamy fluvial sediments. Beneath 2 inches of standing water, soils examined at the relocated outfall site consisted of a peaty muck "O" horizon 0 to 14 inches deep, a "Cg1" horizon of a dark brown fine sandy silt from 14 to 24 inches and a "Cg2" horizon of gray-brown medium sand from 24 to 54 inches. Clay content ranges from 2 to 20% depending on the horizon investigated. Permeability is moderately rapid (2-20 in/hr). Organic content for the Johnston series is high (8-18%). However, due to the landscape position where stream morphology and the cross sectional geometry flatten considerably compared to upstream segments, the organic buildup has increased significantly. This is due primarily to the long-term sustainability of this low gradient, low energy system situated in a broad flat alluvial plain within a relatively undisturbed, pristine watershed. The existing soil conditions at the discharge site, as evaluated by the District and U.S. Fish and Wildlife Service, are consistent with the data presented in the Soil Survey of New Kent County. Statements advanced by the applicant on soil conditions are inconsistent with agency findings and the soil survey data itself.

It is recognized that channelization of a portion of Beaverdam Creek has removed the upper horizons of the pre-existing natural substrate. However, field inspection revealed that portions of the channel have filled in sufficiently to support lush emergent, sub-emergent and aquatic vegetative communities. This is the result of a slow accumulation of natural stream sediments and organic matter, accelerated to some degree by the construction of beaver dams which further slow normal water velocities. The channel does not contain "stiff clays that are resistant to erosion" as purported by RRWSG in the Final EIS.

(b) Impact Analysis: The underlying substrate in both the emergent and sub-emergent vegetated communities contains a high organic content which is indicative of conditions of a low energy system. The presence of beaver activity, both upstream and downstream of the proposed outfall, further supports the conclusion that this portion of Beaverdam Creek is a low energy system with wetland communities that are highly susceptible to potential changes in supporting hydrologic and hydraulic conditions, rates of stream erosion, turbidity and sedimentation. The sustained increase from 4.5 mgd to 32.6 mgd average annual flow would undoubtedly result in erosion and transport of easily removed components of the aquatic substrate, (i.e., organic material, silts and fine sands). This would result in increased sedimentation rates within the upper reaches of Diascund Reservoir, decreased water quality from resulting turbidity and re-suspension of nutrients and pollutants.

The RRWSG characterized the proposed relocated outfall structure as being at "...the upstream end of a man-made, riprapped channel constructed at the foot of an I-64 embankment fill section." This is inaccurate as the channel is only lined on the south side immediately adjacent to and parallel with I-64. Placement of the structure was evidently intended to abate any naturally occurring erosional forces from storm events on the road embankments for I-64 within this section of Beaverdam Creek. This revetment extends to an area on the south side of the westbound lane where it terminates. The north and east sides of the man-made channel are unlined and thus exposed to erosional forces. Furthermore, the channel does not extend downstream to the open water portion of Diascund Reservoir. Rather, the man-made channel terminates approximately 100 feet south (downstream) of the eastbound lane of I-64. From that point, although reported to be within the normal reservoir pool elevation of 26.0 feet at mean sea level, water must actually flow through a series of braided channels and forested wetlands for approximately 1,600 linear feet before it enters the open water portion of the reservoir.

The RRWSG responded to concerns raised by the federal advisory agencies regarding environmental impacts associated with the relocated outfall. However, their rebuttal evaluated the discharge in terms of

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flow velocities per event for potential erosional impact rather than assessing flow volume, duration of peak discharge and frequency of peak discharge for potential impact on the existing wetland ecosystem. The RRWSG utilized the U.S. Soil Conservation Service's TR-55 Graphical Peak Discharge method to model pre- and post high flow conditions. Current pre-project stream flow at the discharge point averages 4.5 mgd. Post-project peak discharge plus ambient flow would raise the discharge to 54.5 mgd. This would represent a 12-fold increase above existing average conditions. Average post-project flow conditions would raise the flow to 32.6 mgd, representing a 7-fold increase above existing average conditions.

The TR-55 is a useful model for application in small rural and urban watersheds to analyze peak flow scenarios. One of the model's variables, Q (runoff depth in inches) is based on a 24-hour cycle. The F factor is an adjustment for ponds and swamps but can only be applied to ponds and swamps that are not along the main flow used to determine the time of concentration. Therefore, the data developed by the RRWSG utilizing the TR-55 methodology may not be accurate, since much of the upstream watershed is comprised of forested wetland swamps hydrologically supported by the stream modeled. Even if the model produced accurate results, it would only be applicable downstream to the point of discharge at the outfall structure, since flow from the pumpover is assumed to be continuous. Evaluation of the continuous hydrologic loading of this section of Beaverdam Creek must be accomplished utilizing other models in which the time of concentration and lag time are major variables. The purpose of such modeling would be to determine the magnitude of hydrologic change on the wetland resources in the near zone of the discharge structure and downstream to the open water of Diascund Reservoir, not to analyze potential erosional forces as was employed by the RRWSG. Additionally, the RRWSG did not take into account existing cross-sectional variations of creek morphology below the discharge point in their velocity calculations.

The RRWSG claims that increased flow velocities could be beneficial to aquatic life and support a wide assemblage of organisms by providing higher dissolved oxygen levels, higher nutrient flushing rates and greater saturation of the floodplain wetlands through recharge. It appears highly unlikely that the stream ecosystem would experience changes that would be beneficial. As existing fish and invertebrate populations are adapted to an average flow of less than 5 mgd, continuous flow events of 32.6 mgd or continuous peak flows of 54.5 mgd would likely change long-term species composition. The National Marine Fisheries Service expressed concern that excessive turbidity would reduce water quality in the Diascund Reservoir and Diascund Creek, affecting the anadromous fish that Diascund Creek supports, and channel enlargement would eliminate the diversity of water depths found in naturally meandering streams. The RRWSG has failed to substantiate their claims. It appears much more likely that the portion of Beaverdam Creek below the outfall would become a degraded system, by increased flow volumes and velocities similar to those streams subjected to excessive stormwater loading in urban areas, since the flow events would occur at a frequency in orders of magnitude above natural conditions.

The applicant offered to correct any erosional problems that developed by implementing such measures as the construction of check dams to dissipate flow velocities and reduce bank undercutting. According to the U.S. Fish and Wildlife Service, this position reflects a lack of understanding of stream dynamics, and that any attempts to correct stream morphology problems once they have occurred are unlikely to succeed.

The relocated outfall structure could also adversely impact a nesting population of the great blue heron (*Ardea herodias*), a species protected under the Migratory Bird Treaty Act. During a March 2000 site

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inspection, District personnel observed a small initiating rookery of four nests located at the very site of the outfall structure. Great blue heron rookeries are very susceptible to human activity and disturbance and are usually only found in forested wetlands removed from the presence of human activity. Construction and operation of the outfall could force the nesting pairs from the rookery, causing nest abandonment. The RRWSG has failed to include any discussion regarding efforts to avoid or minimize impacts to this rookery. Construction and operation of the outfall structure and channelization of 150 linear feet of vegetated wetlands directly beneath a great blue heron rookery could induce unnecessary and, therefore, unacceptable impacts to the rookery. Relocation of the outfall structure further downstream would minimize or avoid impacts to the rookery.

Impacts to existing wetland resources through increased depth of water and duration would be anticipated. Changes range from slight modifications in community composition to complete loss of vegetated systems, depending on the depth and duration of increased water levels. Biogeochemical cycles, such as denitrification, organic decomposition and ferric iron reduction would be adversely impacted with increased rates of flow, alteration of both the anaerobic and aerobic layers of stream stratigraphy, and alteration of the phosphorus cycle through changes in sediment deposition and re-suspension.

Operation of the pumpover with an average 7-fold increase above existing flow conditions in Beaverdam Creek would adversely and permanently change stream dynamics. Changes in stream morphology would result and this low energy system would experience degradation due to sustained increases in flow volumes and velocities. Increasing the average stream flow condition from 4.5 mgd to 32.6 mgd would generate damaging levels of sustained flow volume on downstream aquatic resources, including vegetated wetlands, fisheries and benthic populations. Sustained flow volumes would increase rates of erosion and subsequent deposition of erodible materials (including highly erodible materials such as organics and silts), and would potentially decrease water quality downstream to Diascund Creek Reservoir. The applicant has failed to demonstrate that increasing the magnitude of flow in Beaverdam Creek from an average daily flow of 4.5 mgd to 32.6 mgd would be beneficial to the aquatic ecosystem or that it would not be harmful. Also, the RRWSG has failed to demonstrate that these potential adverse impacts are unavoidable. (For a more detailed discussion of this issue, see the District's report entitled "An evaluation of the outfall on Beaverdam Creek.")

Comments Received on the RROD Regarding the Outfall on Beaverdam Creek: Comments from the City of Newport News stated that "throughout the RROD the Norfolk District bases its conclusions about Beaverdam Creek impacts on the mistaken claim that a sustained average 7 fold increase above existing flow conditions would occur (i.e. 28.1 mgd increase from 4.5 to 32.6 mgd)." The 32.6 mgd average flow figure was developed prior to the state's issuance of a Virginia Water Protection Permit (VWPP) on December 22, 1997. The VWPP stipulates that the maximum transfer from the King William Reservoir to Diascund Reservoir (via the Beaverdam Creek discharge) cannot exceed 26.5 mgd on a 36 month running average basis. The analysis undertaken by the District was based on the proposed discharge volumes applied for by RRWSG in their current permit application and cited in the FEIS. Although the VWPP required a slightly reduced average discharge rate (from 32.6 to 26.5), the RRWSG never modified their application to the Corps of Engineers to reflect the reduced maximum 36 month rolling average discharge rate. Therefore, my analysis, based on the 28.1 mgd average discharge rate and the 50 mgd maximum daily discharge rate, remains valid and is not a mistake as asserted by the RRWSG.

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The City of Newport News failed to indicate that shortly after DEQ issued their VWPP, the RRWSG filed suit against DEQ seeking relief from the more stringent downstream flow release volumes imposed by the VWPP. This provides clear evidence that the RRWSG was desirous of removing the imposed restrictions and returning to the discharge volumes and rates they applied for in their permit application. The proposed discharge volumes were published in the FEIS and correctly utilized in my analysis of the potential impacts to Beaverdam Creek at the proposed outfall structure site. Notwithstanding Newport News' failed efforts to have the reduced volume restrictions imposed by the VWPP removed by the Court, they have gone on record indicating they will seek to modify or eliminate those restrictions from the VWPP when it comes up for re-issuance in 2007.

The VWPP is conditioned to allow a maximum single daily transfer from the King William Reservoir to Diascund Creek Reservoir of 50 mgd, and a 36-month rolling average of 26.5 mgd with a maximum transfer of 29.044 billion gallons for the three month period. Even under these more restrictive conditions, discharge flow rates of 50 mgd maximum daily and 26.5 mgd average flow rate would represent nearly a 12 and 5.9 fold increase, respectively, above average annual flow rates in Beaverdam Creek.

I undertook the analysis of the proposed discharges to Beaverdam Creek utilizing "average" discharge rates rather than the maximum allowable rate. This provided more conservative figures than those produced utilizing maximum allowable discharge rates. The maximum discharge rate of 50 mgd, as permitted by the state's VWPP, did not change from what was requested by the RRWSG in their permit application.

The City of Newport News stated that "the Norfolk District ignores the ecological benefits of flow augmentation in Beaverdam Creek under dry conditions. The largest sustained transfers would occur during severe drought conditions when natural flows in Beaverdam Creek would be very low. These drought conditions are periods in which flow augmentation can benefit plants and animals that live in the Creek and depend on adequate flows." Most all streams located in the upper coastal plain and lower Piedmont physiographic regions share similar hydrographs for unimpounded non-tidal streams. Typically, summer and fall months result in the lowest monthly stage or flow rates. Indigenous plants and animals inhabiting these riverine environments are well adapted to these natural and predictable fluctuating hydroperiods. Artificial hydrologic augmentations, especially sudden high volume discharges (up to 50 mgd as permitted by the VWPP), would not provide the ecological benefits envisioned by RRWSG. Many wetland plant species require periodic drawdown of water levels to supply their root systems exposure to atmospheric oxygen for gaseous exchange and transpiration. Many hydrophytes require sustained periods of low water levels to initiate flowering, seed production or germination. Sudden augmentations of high volumes of water will disrupt nursery and rearing cycles of fish, amphibian and macroinvertebrate populations. It is recognized that some minor flow augmentation may be beneficial to Beaverdam Creek, however, the timing, rate, volume, and duration of discharge for any given year are unknown and, therefore, both the short and long-term benefits are purely speculative. The RRWSG has not provided any evidence that supports their claim that maximum flow augmentations will be beneficial to Beaverdam Creek.

In their comments, the City of Newport News stated that "the RROD ignores that the proposed Beaverdam Creek outfall and short channel connecting the outfall to the creek have been designed to dissipate most of the energy associated with the maximum velocity of water exiting the transfer pipeline." The downstream end of the outfall structure is located in a very low gradient section of Beaverdam Creek.

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The site is currently very shallow and is almost completely dominated by vegetated wetlands, mainly emergent marsh and sub-aquatic wetland communities. The proposed flow volumes and rates exiting the short channel would generate erosional forces which would result in erosion and transport of easily removed components of the aquatic substrate, such as organic material, silts and fine sands. This analysis was correctly undertaken utilizing average and maximum flow rates (32.6 mgd and 50 mgd, respectively) as applied for in RRWSG's current permit application.

In their comments, the City of Newport News incorrectly referenced data provided on page 5-27 of the FEIS indicating that "a 1.5 year storm would generate estimated peak flows that are 3 to 6 times greater than the maximum proposed discharge flows." The statement provided in the FEIS regarding modeled discharges at the outfall structure correctly reads " ...these storms estimated to generate peak storms that are 3 to 6 times greater than the majority (emphasis added) of flows attributable to the pipeline discharge." The majority of discharge flows from the outfall structure, as portrayed in the current permit application, would be 32.6 mgd. A modeled peak discharge of 50 mgd plus the 4.5 mgd average annual flow of the creek results in a maximum peak flow of 54.5 mgd. An estimated 10% exceedence of maximum daily flow would result in a flow rate of 59.3 mgd. Calculated rates for the 2.0 inch and 2.5 inch rainfall peak flow (24 hour event) would generate flow volumes of 52.0 and 63.9 mgd, respectively. Both modeled events only generate approximately twice the flow volume as compared to the 32.6 mgd average daily flow, but are roughly equal to or slightly less than the maximum discharge volume of 50 mgd plus the 4.5 mgd average annual stream flow.

The critical consideration which the RRWSG did not analyze is the frequency of sustained maximum pipeline discharge, or average pipeline discharge compared to the 1.5 year recurrence interval storm event. While Rosgen (1994) indicates that 1.5 year recurrence interval storms generally control channel size and characteristics, those events only occur theoretically once every 1.5 years. In the RRWSG's permit application, the maximum daily discharge of 50 mgd plus the 4.5 mgd average annual creek flow would exceed the 2.0 inch rainfall peak flow at every 50 mgd discharge event. Thus, at every 50 mgd pipeline discharge event, flow volumes would exceed the 2.0 inch rainfall peak flow and would subject that portion of Beaverdam Creek channel to alterational forces.

In their comments, the City of Newport News indicated that the "...District identifies limitations of the TR-55 model, specifically the difficulty in accounting for the effect of forested wetland swamps upstream of the outfall site that are hydrologically supported by the stream... and much of the upstream watershed is comprised of forested wetland swamps..." They assert that "the majority of the drainage area upstream of the proposed outfall location is composed of forested upland with moderate slopes." While indeed much of the "watershed" upstream of the outfall structure is comprised of forested wetlands, the relevant point of consideration is that the F factor is an adjustment for ponds and swamps within the watershed but can only be applied to ponds and swamps that are not along the main flow used to determine the time concentration. The F factor does not consider the character of the watershed as suggested by Newport News, but only the percentage of swamp and pond areas located off the main channel within the watershed.

The City of Newport News asserts that the "Norfolk District applies a double standard by recommending "high flow matches for Cohoke Creek (via King William Reservoir release), yet criticizing large releases to Beaverdam Creek...The RROD provides no basis for why high flows are beneficial for Cohoke Creek but detrimental for Beaverdam." The Norfolk District is not applying a double standard for instream flows. My evaluation premise is very simple, that is: to attempt to narrow the degree of departure from

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the natural hydrograph in each stream, i.e., reduce excessive loading in Beaverdam Creek at the outfall and reduce flow deprivation downstream of the proposed dam on Cohoke Creek. The greater the departure from the naturally occurring stream hydrograph, the greater the risk and potential for sustained and long-term adverse impacts to these aquatic systems and the habitats they support.

In his comments of 2 May 2001, Dennis Tracey of DEQ stated "...the average flow [to Beaverdam Creek] will increase from 4.5 mgd to 32.6 mgd, with a net increase of 28.1 mgd. This net increase of 28.1 mgd, we believe, is based upon the safe yield allocated to the RRWSG in the FEIS. The average increase in flow to Beaverdam Creek will be less for the following reasons. We believe that the RROD has incorrectly designated 28.1 mgd as an average increase when in fact it is the maximum (emphasis added) amount of water that will come into the creek on a sustained basis." This statement is inaccurate. Page 5-26 of the FEIS and the table on page 5-27 of the FEIS clearly state that "a flow of 32.6 mgd (projected future average daily flow)" and "a flow of 54.5 mgd (50 mgd peak pipeline discharge plus current average daily flow)" were the flow rates applied for in the RRWSG's application to the Corps of Engineers.

(3) Cohoke Creek: The existing Cohoke Creek vegetated wetlands perform some sediment retention, but sediment pulses are regularly transferred to downstream wetlands. This downstream transport of sediment is not only normal, but is essential for the natural maintenance of a healthy riverine system. Sediment that is normally transported and deposited downstream would be retained by the proposed King William Reservoir dam and lost to the Cohoke Creek system. The RRWSG estimated that approximately 85 tons of sediment per year would be retained by the proposed dam.

Similarly, the applicant developed a simple model that estimated that the proposed reservoir and the Mattaponi River pumpover would increase nitrogen loading by 44,507 pounds per year and increase phosphorus loading by 11,931 pounds per year above current nutrient loading rates in the Cohoke Creek watershed. The RRWSG counted any nutrient treatment of the pumpover volumes as a net benefit, but even discounting problems associated with trying to quantify the degree of assimilation within the reservoir, the net effect of the pumpover would be elevated nutrient levels in Cohoke Creek proper.

The RRWSG claims that this sediment and nutrient retention would be beneficial to the York River and the Chesapeake Bay. Whereas, in fact, maximizing sediment retention functions would actually be detrimental to the Cohoke Creek system, and the proposed reservoir could result in elevated nutrient loading to the Cohoke Creek watershed. As sediments are eroded downstream of the dam and not replaced by sediments from upstream, there would be an alteration of the streambed and floodplain, which would affect the extent and character of the downstream wetland system. Also, the proposed reservoir would disrupt the existing nutrient transport linkage between the Cohoke Creek headwaters and lower creek mainstem, and result in changes to nutrient loading to the Cohoke watershed. (A detailed review of sediment retention and nutrient assimilation appears in Section 8 f. (2) (d).)

e. Water Quality:

(1) Mattaponi River: The Virginia Department of Environmental Quality (DEQ) maintains a water quality monitoring station on the Mattaponi River at the Walkerton Bridge, 5 miles upstream of the proposed intake at Scotland Landing. Recent data from the monitoring station indicates that water quality in the Mattaponi River is excellent. All surface waters within the Mattaponi River basin have been designated as "effluent limited" by DEQ and there are currently no designated major municipal or industrial discharges in the Mattaponi River basin. Current management of the Mattaponi system in a

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relatively undeveloped state with low consumptive uses has resulted in minimal impacts to both water quality and quantity.

(a) Minimum Instream Flow Requirements: The Corps of Engineers does not have the authority to allocate water by regulating the amount of water that can be withdrawn from a water body. That authority rests with the Commonwealth of Virginia. However, the Corps has the authority to require the maintenance of sufficient minimum instream flows to insure that impacts to water quality, fisheries, recreation, and navigation are minimized. (Regulatory Guidance Letter 85-7.)

The Code of Virginia, Section 62.1-44.38(b) directs the Virginia State Water Control Board (VSWCB) to estimate, for each major river and stream, the minimum instream flows necessary during drought conditions to maintain water quality and avoid permanent damage to aquatic life. In this analysis, it is important to quantify the beneficial uses within the stream, which need to be protected. A full understanding of the extent to which the MIF is contravened under natural conditions, and the extent to which offstream uses may add to these contraventions is necessary for assessment of MIF conditions.

There have been many methods developed to generate instream flow recommendations. These methods analyze fisheries, recreation, aesthetics, power generation and wastewater assimilation to determine the amount of water necessary to protect instream resources. The analysis of higher spring or flushing flows is also necessary in order to assess the impacts to fish migration or the removal of fine sediments from the stream bottom. Impoundments often provide a dampening effect during extreme flows but also may eliminate the seasonal high flows necessary for ecosystem maintenance (VSWCB, 1986).

The Tennant (Montana) Method is one of the most frequently utilized instream flow assessments. According to DEQ, this method was developed based on the analysis of hundreds of flow regimes near USGS gauges in many states. The recommendations are based on many years of observations regarding the adequacy of various flow rates to meet the needs of aquatic resources. The VSWCB (1986) confirmed that much of the early research used to develop the method was conducted on eastern streams with geomorphological characteristics similar to those found in the Commonwealth of Virginia. The report also confirms that there is some level of consistency in the relationships between the width, depth and velocity of discharge of streams in different physiographic provinces.

Advantages of the Tennant Method are that it is quick, inexpensive, and easy to use. It uses an incremental approach because the relative health of the aquatic habitat can be evaluated for different flows. It can be extended to ungauged streams by averaging the flow recommendation values for gauged areas for a specified drainage area. The Tennant Method allows for either annual or seasonal assessment of stream quality by modifying the analysis to reflect periods vital to the health of aquatic life. The VSWCB (1986) stated that dividing the year into two 6-month periods corresponding to the wetter or dryer portion of the year may not be appropriate in Virginia since the critical periods may not correspond to high flow seasons. The District believes a more accurate use of the Tennant Method would be to divide the year into periods of critical life history stages to insure that necessary flows are adequate during these times of the year.

The 80% Exceedence Flow, another MIF methodology, is based on the monthly flow rate which has the probability of being exceeded 80 percent of the time during the period of record. The 80% Exceedence Flow can be modified to provide additional protection measures for instream resources and/or future demand needs for the watershed. The 80% Exceedence Flow also provides additional protection to

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instream needs as it utilizes median monthly flows as the basis for the MIF conditions rather than the mean annual flows of the Tennant Method. The fluctuating flows allow for additional MIF values during critical times of the year (i.e., anadromous fisheries migration or spawning periods, endangered or threatened species propagation, salinity intrusion periods).

The proposal by the RRWSG is stated in the Final EIS to be high flow skimming in order to avoid potential impacts when saline water naturally moves farther upstream during dry periods. In a letter dated 5 September 1996, Malcolm Pirnie, Inc. discussed the MIF proposal and concluded that the estimated tidal flow near Scotland Landing was over an order of magnitude greater than the estimated freshwater discharge. Thus, the influence of tidal flow at Scotland Landing would dominate hydrology and overshadow any potential effects of withdrawals on natural streamflow variability.

The FEIS utilized such a Modified 80% Exceedence flow for both the Pamunkey River withdrawal and the KWR-II reservoir. For the Pamunkey River, this flow was modified to include a minimum flow rate of 140 mgd which must be maintained when available, an additional 25 mgd for irrigation during the months of April to September, and an additional 40 mgd for possible future Hanover County withdrawals (FEIS, 3-10). For the Mattaponi River, the 80% Exceedence flow was modified to set up a minimum flow threshold of 108.5 mgd (lowest median monthly streamflow value (September) at Scotland Landing) and reserve an additional 5.5 mgd for the SWCB's projected Year 2030 consumptive uses in the Mattaponi River Basin (exclusive of potential use by RRWSG jurisdictions, FEIS 3-11). The FEIS also states that, "Based on the Mattaponi River Basin streamflow records for the Water Years 1942 through 1987, it is estimated that the assumed Mattaponi River MIF (Modified 80% Exceedence flow) would allow some withdrawals to occur 69.6 percent of the time." In addition, the FEIS acknowledges that, "The Modified 80% Monthly Exceedence Flows MIF would better preserve the shape of the Mattaponi River's natural season hydrograph and establish monthly MIF levels which are higher for each month of the year."

The RRWSG proposed the use of the 40/20 Tennant MIF at KWR-IV in the FEIS due to the reduction in the total and available storage of 9.0 and 6.6 billion gallons, to provide for sufficient safe yield, and to allow more frequent withdrawals from the Mattaponi River. As the District staff could not make any determination of acceptability of specific permit conditions until the final permit decision, it should be noted that the District did not approve the use of the 40/20 Tennant method instead of a modified 80% exceedence MIF as asserted by the RRWSG. The District staff merely stated that the 40/20 Tennant method might be determined to be sufficient to protect resources in the Mattaponi River after conclusion of the reviews of impacts to anadromous fish and the sensitive joint-vetch. The FEIS stated that, "The KWR-IV reservoir configuration, in combination with other practicable project components, would provide sufficient yield to meet the RRWSG's projected needs if the originally proposed 40/20 Tennant MIF were retained for the Mattaponi River pumpover. If a more restrictive MIF were imposed, then the reservoir yield would not be sufficient to meet projected needs of the Lower Peninsula localities and host communities through the RRWSG's planning horizon." Safe yield is an accepted planning device, but it does not represent the actual amount of water available to consumers during a severe drought. In practice, water managers impose emergency restrictions well in advance of the point of total depletion to reduce the risk of failure to the system (FEIS, 3-8). The safe yield is based on the level of acceptable risk and management's conclusions as to the reliability and resiliency of the system to respond during critical dry periods.

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The calculations performed by the RRWSG utilized a minimum acceptable reservoir dead storage of 33.3 percent of the total storage. A model developed for Newport News Waterworks by Camp Dresser McKee (CDM) and referenced in the FEIS (3-9) calculated actual dead storage as 11.8 percent of the total storage capacity, which corresponds to the percentage of total storage within the existing Newport News Waterworks reservoirs from which water could not be pumped by existing pumping stations. Comparing the 33.3 percent dead storage level proposed by the RRWSG with the 11.8 percent actual dead storage calculated by CDM, the RRWSG plans to use only 76 percent of the available water in the reservoir and to hold 24 percent of the potentially available water in reserve. Therefore, the RRWSG has underestimated the true safe yield of the system. Furthermore, even if the default value of 25 percent dead storage is used instead of the CDM figure of 11.8 percent dead storage volume, Newport News Waterworks' preferred 33.3 percent dead storage still reduces available water by 11 percent. If the additional 11 percent of the available water is included in the assessment of safe yield for the KWR-IV reservoir, then the potential difference between the currently proposed 40/20 Tennant MIF and the Modified 80% Exceedence MIF would be negligible. Thus the RRWSG could provide additional safety margins within the Mattaponi River with no detrimental impact to the reservoir by utilizing the Modified 80% Exceedence figures.

Newport News claimed that the DEQ permit was unfairly restrictive, reducing by as much as one-third the amount of water they could withdraw from the Mattaponi River. They stated that DEQ's required Minimum Instream Flow and other conditions of the permit would provide only 16 mgd safe yield benefit and would "cripple the project." However, in a report dated 27 October 2000, the City of Newport News re-calculated the safe yield benefit of the KWR-IV reservoir configuration based on the conditions contained in the Virginia Water Protection Permit and determined that the reservoir would provide 19 to 21 mgd.

The Institute for Public Representation (IPR), representing the Mattaponi Indian Tribe, commented to the District that the proposed minimum instream flow presented by the RRWSG would have a negative impact on the shad population in the Mattaponi River. Since shad are of critical importance to the Mattaponi Tribe as both a source of food and income as well as a resource of cultural and religious significance, additional protection measures to minimize any impact to their population dynamics is something I consider to be warranted. The National Marine Fisheries Service commented that because anadromous and semi-anadromous fish populations in the Mattaponi, Pamunkey, and Cohoke Creek drainages are currently low, significant impacts to these species are not tolerable. In his review of potential effects of the proposed withdrawal on anadromous fish in the Mattaponi River, Dr. Greg Garman of Aquatic Resources, LLC, consultant to RRWSG, expressed concern that adequate stream flows and natural hydroperiods be maintained during the summer months to protect the riverine and riparian habitat for juvenile fish and suggested the maintenance of a more conservative minimum instream flow (MIF) than the 40/20 Tennant method proposed by the applicant for this critical period. The Virginia Department of Game and Inland Fisheries also recommended that the RRWSG adopt the Modified 80% Exceedence flow schedule as well as a time-of-year restriction during construction of the intake structure in the Mattaponi River from 15 February through 30 June to protect spawning individuals.

By letter dated 18 September 1998, the U.S. Fish and Wildlife Service submitted their Biological Opinion for the King William Reservoir project. As part of the Conservation Recommendations for protection of the federally listed threatened sensitive joint-ventch, the Service suggested, "The adoption of the minimum instream flow restrictions on raw water withdrawal from the Mattaponi River... which stipulate a

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Mattaponi River flowby regime (water amount left for instream purposes) of a Modified 80% Exceedence of each month's flow duration statistics." The Service stated that other flow levels could be investigated to provide additional water during several winter months. The Service noted that the proposed 40%/20% minimum flow did not have enough linkage to biological processes or historic flow regimes. In addition, many parameters beyond salinity levels affect the functioning of a tidal freshwater ecosystem since many riparian plants are adapted to seasonal timing components of a natural flow regime of flowering, seed dispersal, germination and seedling growth.

The agreement between the City of Newport News and King William County for the development of the King William Reservoir requires that the water surface elevation of the reservoir stay at the highest level practical to accommodate recreational interests. The City agreed to design and construct a boat ramp and floating pier to insure that recreational access will be maintained provided that the water surface elevation is within 15 feet of the spillway elevation. There are also monetary penalties involved if the reservoir surface elevation drops below this elevation for 6 percent of the calendar year. For this reason, the RRWSG will seek to maximize the withdrawals from the Mattaponi River in order to protect the recreational interests within the reservoir. This higher withdrawal rate may result in increased impacts to the Mattaponi River.

The RRWSG claims that there will be no adverse impacts to anadromous fisheries, wetlands, threatened species, or water quality as a result of the proposed withdrawal. However, because I believe the potential exists for impacts to these resources, the District developed monitoring protocols that would be included as a condition of a permit, if one were to be issued, to provide long-term data gathering and analysis (see Section 8. k, Monitoring Plan). Conclusive evidence will not be available until the various monitoring efforts and studies have been completed many years after the project is built.

Therefore, based on recommendations from the U. S. Fish and Wildlife Service for the protection of the sensitive joint-vetch, the concerns raised by the National Marine Fisheries Service and the Virginia Department of Game and Inland Fisheries for the protection of anadromous fisheries, the specific condition requiring this flowby in the Virginia DEQ's VWP permit, the availability of additional water utilizing the default value of 25 percent dead storage level versus the RRWSG preferred 33.3 percent of reservoir storage capacity for the KWR-IV reservoir, and the fishery concerns raised by the Mattaponi Tribe, I have determined that flow-bys based on the Modified 80% Exceedence rules for withdrawals in the Mattaponi River must be required if a Corps permit were issued. A detailed discussion of Minimum Instream flow appears in the District's "Analysis of Minimum Instream Flow Requirements for the King William Reservoir Project."

Comments Received on the RROD Regarding Minimum Instream Flow Requirements: The City of Newport News stated that as the VWPP issued in 1997 already requires that Mattaponi River withdrawals comply with the Modified 80% Monthly Exceedence MIF, this should be the basis of Norfolk District's evaluation of the permit application. They contend that the fact that the RRWSG proposed the less-restrictive 40/20 Tennant MIF levels in its Joint Permit Application is irrelevant. Not only did the RRWSG originally apply for greater withdrawals that were based on the less-restrictive MIF, but they have objected to the VWPP's Modified 80% Exceedence MIF limitations and have not proposed that their Joint Permit Application be modified to comply with this MIF requirement. They have also indicated that they intend to request that the MIF stipulated in the VWPP be changed to their proposed 40/20 Tennant MIF method when the permit is re-issued in 2007. Therefore, I have no choice but to evaluate their permit application with the information they have submitted.

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The City of Newport News also stated that the Norfolk District has set an unreachable standard in saying that the 40/20 Tennant MIF would not be sufficient to “eliminate impacts,” as they believe there are no regulatory requirements to eliminate all impacts. They indicated that the appropriate question is how significant the impacts would be if the 40/20 Tennant MIF were required, and stated that the Mattaponi River salinity modeling analysis revealed that significant impacts would not occur due to the withdrawals. It is clear from these statements that the RRWSG has not abandoned their efforts to increase the withdrawal rate in the Mattaponi River in excess of that allowed under the Modified 80% Monthly Exceedence MIF as required by the VWPP. The RROD discusses this issue extensively (pages 42-45). I have concluded, based on independent analysis as well as consideration of comments from the U. S. Fish and Wildlife Service, Virginia Department of Game and Inland Fisheries, National Marine Fisheries Service and the Virginia Department of Environmental Quality, that the Modified 80% Monthly Exceedence MIF would be necessary to reduce impacts to fisheries, threatened species, and flow patterns in the Mattaponi River. A detailed discussion on the salinity analysis is provided in my response to the City’s comments in the following section of the Final RROD.

(b) Salinity of Mattaponi River Water: The proposed pumpover from the Mattaponi River would reduce the freshwater flow in the river and would shift the freshwater/saltwater interface upstream. The migration of more saline waters into freshwater zones presents a potential for the loss of tidal freshwater habitat and changes in wetland plant community composition, with resultant adverse effects on plant and animal species. These freshwater wetlands serve to protect water quality in the Chesapeake Bay and provide habitat for rare plant species, migratory waterfowl and anadromous fish. Potential impacts to the federally listed threatened sensitive joint-vetch and to the river’s shad population are of special concern. Species diversity is also affected by changes in river salinity. Due to salt stress, the number of species of wetland plants commonly found in marshes decreases as salinity increases. Furthermore, reduced freshwater flows in the Mattaponi River could reduce kinetic energy and alter suspended sediment loads and erosion rates. Also, the upstream movement of the freshwater/saltwater interface could move the flocculation point, thereby affecting sediment deposition patterns. As these changes would affect the substrate available for plants, they would contribute to changes in the composition of wetland communities and fish and wildlife habitat.

Salinity in the tidal freshwater portion of the Mattaponi River approaches zero but is also influenced by the rise and fall of the tide, bringing salt water upstream. Salt concentrations in tidal waters vary from month to month depending on the amount of freshwater input from rainfall and groundwater discharge. Because salinity has been shown to be a limiting factor in wetland plant distribution within tidal marshes, an investigation of the possible impacts of the proposed freshwater withdrawal on salinity patterns and vegetative communities on the Mattaponi River was performed for the RRWSG by the Virginia Institute of Marine Science (VIMS). The results of the modeling effort are summarized in the 1991 VIMS report entitled “Tidal Wetlands on the Mattaponi River, Potential Responses of the Vegetative Community to Increased Salinity as a Result of Freshwater Withdrawal” by Hershner, Booth and Mitchell.

Using the long-term salinity intrusion model developed at VIMS, the applicant’s environmental consultants, Malcolm Pirnie, Inc., simulated a salinity record for the Mattaponi River between 1942 and 1987 using historical and adjusted freshwater inflows. They then simulated a salinity record for the same time period including the RRWSG’s proposed freshwater withdrawal scenario. Then, VIMS compared the predicted salinity patterns provided by Malcolm Pirnie, Inc. with the existing plant community distributions from the summer of 1990 and historical vegetation distributions from 1953, 1971, and 1987 aerial photography. Salinity in the tidal freshwater zone ranges from 0.0 to 0.5 parts per thousand (ppt),

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while salinity in the oligohaline zone ranges from 0.5 to 5.0 ppt. As plant distribution patterns correspond to salinity patterns, long-term changes in wetland distributions can be predicted in response to anticipated salinity changes. Wetland plants which have known associations with long-term salinities in these ranges were chosen for the VIMS study.

The applicant's simulated salinity record indicated that the proposed withdrawal would result in an upstream shift in the average salinity levels by about 1 kilometer (0.62 miles) and indicated only minimal salinity increases between adjacent transects for the RRWSG's proposed withdrawal scenario when compared with the historical salinity record over the same period. The mean annual salinity levels in the critical tidal freshwater-oligohaline transition zone were predicted to increase by about 0.1 to 0.2 ppt as a result of the proposed freshwater withdrawal scenario. The City of Newport News claims that this change in salinity would be miniscule when compared to natural salinity fluctuations from tides and droughts.

VIMS quoted previous researchers who have reported that natural fluctuations in mean salinities due to freshwater discharge and groundwater input as well as changes due to freshwater withdrawals have been known to have a significant long-term impact on wetland vegetation patterns. Although the actual salinity increase is predicted to be greater downstream, the percentage of change would be more significant upstream where the existing salinity approaches zero. While these increases might appear small, they will be sustained for as long as the withdrawal exists and will exacerbate any natural salinity increases during times of drought and/or during periods when the wind pushes the tidal water farther upstream. Furthermore, tidal freshwater and oligohaline wetlands are known to be more sensitive to persistent long-term salinity increases than are the more stable downstream mesohaline (5.0 to 18 ppt) wetland communities.

The authors of the VIMS report noted that the conclusions of their assessment were limited to the effects of only the single proposed withdrawal location at Scotland Landing under the modeled RRWSG withdrawal scenario and are not applicable to other withdrawal scenarios. In evaluating a single withdrawal from one river, the model did not address the dynamic relationship among the Mattaponi, Pamunkey and York Rivers. Also, the study did not assess **all of** the effects of other withdrawals on the Mattaponi or Pamunkey River system, the cumulative effects of other consumptive uses, or the additive effects of any future potential withdrawals with natural, pre-existing salinity fluctuations. The model looked at the effects of infrequent salinity peaks due to storm events, but did not evaluate the effects of small, but more consistent daily peaks that may have a more profound adverse effect on plant communities.

There was significant public criticism regarding the validity of the conclusions of the simplistic, one-dimensional VIMS salinity model because it relies on monthly averages rather than capturing salinity changes throughout a daily tidal cycle, and does not consider the vertical salinity gradient. Two substantive critiques of the results were received in response to the FEIS (Dr. Linda M. Huzzey of the U.S. Coast Guard Academy and Dr. Wu-Seng Lung of the University of Virginia, both on behalf of King and Queen County). Therefore, with the assistance of EPA, the Norfolk District contracted with the Corps' Waterways Experiment Station (WES) Coastal and Hydraulic Laboratory in Vicksburg, Mississippi to review the 1972 VIMS model and the Hershner, *et al.* report as well as the two critiques.

Because changes in mean salinity levels can have a significant long-term impact on vegetation patterns, WES believes that it is important to investigate the possible impact of salinity changes over a time scale of decades. WES concluded that the long-term approach taken by Hershner, *et al.* to assess the impact of

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the freshwater withdrawals on possible long-term vegetation changes was technically sound because hydrological conditions in the Chesapeake Bay vary both seasonally and on a long-term scale. They cited a report that showed dry periods dominated from 1951 to 1969 followed by extremely wet years in the 1970's and wide variations over the last 20 years. WES believed that Dr. Huzzey and Dr. Lung made valid statements in their criticisms, and agreed with many of Dr. Huzzey's concerns about the assumptions in the VIMS study. However, Dr. Huzzey's suggestion to run a 40-year simulation of a three-dimensional model on the Pamunkey, Mattaponi and York River systems would be a formidable task that would be both very expensive and time consuming. Considering the time and funding constraints of the permit process, WES felt that a three-dimensional model should not be required if it can be shown that salinity does not vary appreciably over the cross-section. Although the resolution was coarse (vertical 5 feet, longitudinal 2.5 to 4 km spacing), WES concluded that the VIMS' assumptions of lateral and vertical homogeneity appear reasonable. WES concluded that although the results from the VIMS one-dimensional model were averaged over cross-sections and tidal cycles, the model is adequate to address the impact of the freshwater withdrawals on salinity in the Mattaponi River.

WES recommended some limited three-dimensional modeling to fully justify their belief that the effects discussed by Dr. Huzzey would indeed be small. WES also recommended a re-run of the one-dimensional model to include the effects of anticipated known withdrawals from both the Pamunkey and the Mattaponi Rivers to assess the cumulative impacts of consumptive withdrawals to the York River. The applicant's environmental consultant, Malcolm Pirnie, Inc. performed the recommended analysis and concluded that the overall mean salinity level would increase by no more than 0.01 ppt from the previous Mattaponi River withdrawal scenario, overall mean and maximum salinity levels increases would be one percent or less, and the predicted mean salinity levels would be less than the historical mean salinity levels at adjacent downstream transects. From these results, Malcolm Pirnie, Inc. determined that the conclusions from the 1991 Hershner *et al.* study should apply to the Mattaponi River when projected Pamunkey River withdrawals are included in the analysis.

WES clarified that since a numerical model is an abstraction and only an attempt to represent nature, certain natural processes can be reproduced, while others cannot. Therefore, the modeler must select a model that will be adequate for the needs of a study, and must determine which processes are important, then make sure those processes are correctly simulated. WES stressed that predictions should not be made beyond the range of conditions for which the model was calibrated. Although WES found both the VIMS model and methodology to be appropriate, it should be noted that WES did not independently validate, or even comment on, the conclusions drawn by the RRWSG in interpreting the results of the VIMS model.

Based on the RRWSG's simulated salinity records, the VIMS report anticipated little or no upriver shifts in the distribution of existing wetland vegetation as a result of the predicted upstream salinity shift. The model predicted that the proposed withdrawal of freshwater also would not significantly increase the total number of days or percentage of days in which seasonal mean salinities exceeded the long-term salinity tolerances of the wetland plant community types studied. From the VIMS report, the RRWSG has concluded that freshwater withdrawals from the Mattaponi River would be immeasurable and inconsequential, and would not result in any impacts to fish and wildlife resources including tidal freshwater invertebrates, anadromous fish and the sensitive joint-ventch. They have made a similar claim concerning the Pamunkey River and its resources. It should be noted that the VIMS report addressed only the predicted spatial distribution of existing wetlands, and did not evaluate the effects of the upstream salinity shift on any fish and wildlife resources or endangered and threatened plant or animal species. Therefore, the RRWSG's extrapolation of the VIMS finding to these resources is unsupported.

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The U. S. Fish and Wildlife Service commented that the Mattaponi and Pamunkey Rivers possess outstanding resource values which are at risk from salinity intrusion. The Service also cautioned that while accurate, the RRWSG's statement that "Natural Mattaponi River salinity fluctuations greatly exceed any salinity changes that were predicted due to withdrawals" should not be misinterpreted to mean that as long as changes stay within the range of natural variation, salinity changes are not detrimental. Both the Fish and Wildlife Service and the Virginia Department of Conservation and Recreation commented that some organisms and life stages have a much lower threshold for negative effects from chronic exposure to increased salinity or higher frequency of occurrence. During certain life stages, some species may be harmed by acute salinity impacts that would occur during maximum pumping events. The Service commented "The use of 'average pumping rate' obscures the model's ability to detect detrimental salinity changes on benthos and aquatic animal species because significant departures from baseline may be found when pumping occurs at maximum rates." Organisms in the low-salinity upper estuary may be particularly at risk for impact from very slight changes in water chemistry as some of these freshwater and estuarine species may already be at the edge of their physiological tolerance. Even a change in salinity as slight as 0.1 ppt could cause a significant decrease in growth and reproduction for these organisms. Also, a variety of plant metabolic processes, including germination, nutrient uptake, productivity, seed production, and community establishment are known to be affected by salinity. Salinity is an important growth-limiting factor in wetland species and the effects of salinity on function and anatomy may vary during various plant developmental stages.

The Virginia Department of Conservation and Recreation further commented that salinity alone is not an adequate variable for predicting all effects of the withdrawal of freshwater on plants and animals. Freshwater withdrawal may result in changes to water chemistry, including concentrations of macro-and micro-nutrients such as nitrogen, phosphorus, potassium, iron, cobalt and dissolved organic carbon as well as major inorganic elements such as chloride, sodium, magnesium, sulfate, calcium, and bicarbonate. The U. S. Fish and Wildlife Service commented that the VIMS study does not answer all questions on the potential salinity intrusion impacts on aquatic plants and organisms from project withdrawals and other cumulative withdrawals in the York River system. In their 28 March 1996 comments on the Supplement to the Draft EIS, the Service stated "The Service has serious concerns with the accuracy and validity of the conclusions drawn from the applicant's salinity modeling efforts." and "The numerous errors and omissions in the salinity modeling presented in the DEIS/SEIS do not allow conclusions to be drawn about the impacts of salinity intrusion on the Federally threatened sensitive joint-vent or other fish and wildlife resources." The Fish and Wildlife Service further stated that "Encroachment of higher salinities would affect large portions of the Mattaponi and Pamunkey Rivers and detrimentally impact fish and wildlife resources and their habitats as freshwater tidal zones are reduced. The concept that marsh communities and fish spawning habitats could readily migrate upstream with salinity changes is likely false due to a variety of unsuitable habitat features or barriers."

(c) Comments Received on the RROD Regarding Salinity in the Mattaponi River: Comments were received from the City of Newport News on behalf of the RRWSG in their report dated 4 May 2001, and from Benjamin Turner of Environmental Systems and Technologies, Inc. in a 3 May 2001 report entitled "Review of VIMS Salinity Intrusion Model for the Mattaponi-Pamunkey-York River Systems."

The City of Newport News provided extensive comments regarding the salinity modeling and potential changes associated with the water withdrawal from the Mattaponi River. I will address the general issues raised. I will not address each comment in detail, however, as this issue was not by itself a major factor in my decision. A detailed response to each point in the City's comments is contained in a memorandum for

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the record which is a part of the administrative record. The City of Newport News stated that the appropriate regulatory question is not whether impacts will occur, but whether they would be significant. Significance of impacts is an important consideration, but not necessarily determinative for both NEPA and public interest review purposes. While some of the adverse effects discussed in the RROD are not by themselves significant, the combination of adverse environmental impacts, including those that may occur as a result of the predicted salinity changes in the Mattaponi River, is significant.

The City of Newport News contends that the District overstated the predicted salinity changes, and stated that the increase would be less than or equal to 0.08 ppt, not 0.1 to 0.2 ppt as reported in the RROD. The 1991 VIMS model predicts small increases in salinity for each of three sets of transects, annually and seasonally. The 0.08 ppt increase in mean and maximum salinity levels cited by the RRWSG refers to the tidal freshwater zone only. The RROD refers to the predicted mean annual salinity levels in the critical tidal freshwater-oligohaline transition zone, which is the primary area of concern. The 0.1 to 0.2 ppt cited in the RROD was first cited by the RRWSG in the Final EIS, on page 5-47.

The City's conclusions are based on the 1991 VIMS Salinity Intrusion Model. While the VIMS one-dimensional model was determined to be essentially sound by the Corps of Engineers Waterways Experiment Station (WES), it does include a number of assumptions necessary to simplify a naturally complex system. WES also noted that the model and data comparison at various transects were not always good. Furthermore, the conclusions drawn from the salinity study are based on conditions averaged across the tidal cycle and river cross section, and may neglect extreme conditions. The model has not been verified with independent data to ensure that it accurately predicts the distribution of salinity at high water slack tide (where salinity is at its highest point in the tidal cycle).

The City of Newport News claims that the Norfolk District focuses on the maximum proposed Mattaponi River withdrawal capacity of 75 mgd, but ignores the fact that the withdrawals would normally be far less than that. They also stated that the District ignores tidal flows and other freshwater inputs to the York River system, which are far greater than the freshwater flow components in the River. Although water withdrawal may be far less than the maximum permitted capacity much of the time, there are times when the instream flow will be reduced to the lowest allowed level. In fact, the withdrawal could remove as much as 40% of the freshwater flow in the River. Averaging the withdrawal rate over time and calculating the "normal" withdrawal does not accurately reflect the maximum salinity change or the minor salinity peaks throughout the tidal cycle, whose increased intensity or frequency are expected to have an adverse cumulative effect on plant and animal communities. Tidal flows are not considered in calculating the effects of freshwater withdrawal, because the VIMS Salinity Intrusion Model, which the applicant used to predict the effects of the withdrawal on salinity levels, is a one-dimensional model in which water flow is assumed to be linear in the downstream direction. A more detailed three-dimensional model would allow consideration of tidal flows, but this has not been conducted by the RRWSG. As stated previously, since salinity effects are not by themselves a major factor in my decision, I do not think that requiring the RRWSG to use such a model is necessary. Therefore, additional potential inflows, such as those cited by the City of Newport News (the mill and sewage treatment plant at West Point), are also not considered. This is another reason that the simplification inherent in models, particularly the one-dimensional model employed here, may reduce their ability to produce precise results.

The City of Newport News stated that they conducted a separate biological impact assessment for tidal wetland vegetation, fisheries and invertebrates and that this report concludes that the proposed freshwater withdrawals would not result in any impacts to fish and wildlife resources. The District agrees that the

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general habitat assessment and species characterizations contained in the applicant's "Pamunkey River Salinity Intrusion Impact Assessment" (1995) can be used to assess potential effects of increased salinity on fish and wildlife resources in the Mattaponi River. However, as the RRWSG interpreted the salinity modeling results to show that anticipated salinity changes in the Mattaponi River would be minimal, no real assessment of small changes in the frequency, duration or intensity of salinity on the river biota was conducted. Information presented in the RROD suggests that even small changes can affect freshwater and oligohaline species, and the simulated salinity record provided by the RRWSG indicates that the proposed withdrawal would result in an upstream shift in the average salinity levels by about 1 kilometer. Although the RRWSG reported that the sensitive joint-vetch has a wide geographic range along the Pamunkey River, which shows that the species may be tolerant of more saline conditions, they provided no data correlating plant locations with measured salinity ranges. No additional information or analysis has been provided by the applicant to suggest how the plant would respond to specific increases in salinity levels, such as the small changes predicted to occur in the Mattaponi River. However, a February 2000 monitoring report of sensitive joint-vetch populations conducted by Garrie Rouse for the Virginia Department of Agriculture and Consumer Services indicates that the most downstream populations of sensitive joint-vetch in the Mattaponi River have shown signs of stress due in part to salinity increases during periods of decreased freshwater flows.

Many of the other comments made by the City of Newport News, such as the effects of cumulative Mattaponi and Pamunkey River withdrawals and the allowance for non-RRWSG withdrawals, have already been addressed in the RROD (pages 47 and 43, respectively).

In a 3 May 2001 report entitled "Review of VIMS Salinity Intrusion Model for the Mattaponi-Pamunkey-York River Systems," Benjamin Turner of Environmental Systems and Technologies, Inc., expressed concern that increased salinity could damage the existing Mattaponi River ecosystem since salinity affects dissolved oxygen concentrations, biological productivity, pH, and other environmental factors. Environmental Systems and Technologies, Inc. was contracted by the Virginia Chapter of the Sierra Club to examine the validity and accuracy of the salinity model. They examined "model simplifying assumptions, initial and boundary conditions, model calibration, model verification, model sensitivity analysis, and the appropriateness of time and space discretizations." Mr. Turner's review concluded that the VIMS salinity model may not yield results with an adequate level of accuracy for the purpose of simulating the effects of fresh water withdrawal on salinity. Mr. Turner discussed a number of factors that may limit the suitability of the VIMS salinity model for characterizing the impact of fresh water withdrawals on salinity in the Mattaponi River. These include the inherent limitations of the model, possibly inappropriate calibration data, and no independent verification of the accuracy of the model using data that is independent of the calibration data. Again, since salinity impacts alone are not a major decision factor, I did not request a review of these comments by WES, but these concerns do point out the limitations of the one-dimensional model used by the RRWSG to assess impacts on salinity, as discussed above.

(2) Pamunkey River Water: Although the freshwater flow on the Pamunkey River itself may not change appreciably from the reduction of freshwater input from Cohoke Creek, salinity changes at the confluence of the Mattaponi and Pamunkey Rivers could affect the location of the freshwater/saltwater interface in the Pamunkey River as well. This change has the potential to result in adverse effects on plant and animal species in the Pamunkey River, but to a lesser degree than those expected in the Mattaponi River. As in the Mattaponi River, of particular concern are potential effects to anadromous fish spawning and reproduction and rare plant species such as the sensitive joint-vetch.

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(3) Cohoke Creek: Roughly half of the total 17 square mile drainage area (8.9 square miles) would be affected by the impoundment and the flow pattern of Cohoke Creek would be significantly and permanently altered. The impoundment would inundate approximately 21 miles of free-flowing streams (9 miles perennial, 12 miles intermittent) and reduce the average flows to the Pamunkey River by up to 5 mgd. The net reduction in freshwater discharge below the dam would restrict stream flows to about one third of the existing average flow and would result in adverse impacts to the wetland vegetation and the fish and wildlife that Cohoke Creek and Cohoke Millpond support. The RRWSG claims that flow rates downstream of the dam would not change appreciably because their release schedule would attempt to mimic natural downstream flow in Cohoke Creek. Nevertheless, I believe the presence of a new large impoundment would permanently alter the existing flow regime and associated processes of sediment transport, channel-forming and channel-maintaining flooding events and the timing and magnitude of flood flows.

In addition to short-term water quality impacts from increased turbidity associated with land clearing and dam construction, long-term water quality characteristics of Cohoke Creek downstream of the proposed dam are expected to be adversely impacted by the average two-thirds reduction in flow volume from the impoundment. Long-term water quality changes are expected from filling the impounded area with Mattaponi River water. The vast open water expanse of the proposed reservoir is estimated to result in a minor increase in atmospheric deposition of nitrogen and phosphorus to the aquatic environment. As the majority of the water in the reservoir would be pumped from the Mattaponi River, elevated nutrient concentrations in the reservoir are expected; however, how that change would affect nutrient loading to Cohoke Creek cannot be determined. Since the applicant proposes to avoid Mattaponi River withdrawals when salinity levels are elevated at the intake, significant changes in chloride levels in the reservoir would not be expected.

Also, stratification of the reservoir water, especially in summer months, could lead to anoxic conditions and low temperatures at the bottom of the reservoir. Downstream water quality problems and associated fish kills could result from the release of water from the lower levels. Therefore, it is unlikely that water quality in Cohoke Creek and the York River Basin would improve as a result of this project as claimed by the RRWSG. The Virginia Department of Game and Inland Fisheries recommended that downstream releases from June to October should contain at least 75% epilimnetic water to prevent temperature shock to stream fish during the summer and to prevent excessive discharges of anoxic hypolimnetic water that could stress or kill fish in Cohoke Creek. They also recommended a monitoring program to document shifts in water temperature and dissolved oxygen below the dam.

The RRWSG proposes a multilevel release of water from the proposed KWR-IV dam at elevations to protect downstream water quality. A condition of the DEQ VWPP requires that the RRWSG prepare an operations and maintenance manual for DEQ approval that would specify the procedures, measurements and calculations that would be performed to ensure that the release of water from the dam to Cohoke Creek would not cause the violation of water quality standards for dissolved oxygen, temperature or pH. The District has not seen this manual. Although this condition would aid in the protection of water quality, the District and the advisory agencies continue to emphasize that the volume of water released to the downstream system is vital to maintenance of the wetland system located downstream of the proposed King William Reservoir.

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(a) Downstream Releases: Concern for maintaining the existing hydrologic regime for downstream wetlands has been raised by the District and the advisory agencies. In their 25 July 1997 letter, the U.S. Fish and Wildlife Service expressed concern that all or a portion of the wetlands downstream of the KWR-IV dam would be impacted by inappropriate flow regime for reservoir releases. In a letter dated 22 July 1999, the Service indicated that they were still concerned the RRWSG's plan for downstream releases did not avoid impacts to the functioning of downstream wetlands. In a report entitled "Evaluation of Potential Downstream Effects from King William Reservoir," the applicant described a modified schedule for downstream releases which they contend would mimic the natural downstream flows in Cohoke Creek and would afford a high degree of protection for the downstream ecosystem. The RRWSG's modified downstream release proposal is to release an average of 2.5 mgd during normal higher reservoir pool condition and a 1.5 mgd average annual release would be used when the King William Reservoir storage declines to less than 80 percent (which equates to a reservoir pool elevation of approximately 92 feet at mean sea level). The proposed downstream releases would be equal to about one third of the existing estimated 6.2 mgd average flow at the dam site.

The Virginia Department of Game and Inland Fisheries commented that research has shown that a reduction in stream flow of this magnitude would not be adequate to protect the fish populations or adjacent wetlands. Therefore, they recommended that the discharge flows be revised to maintain median monthly flows in Cohoke Creek. The U.S. Fish and Wildlife Service also expressed concern that the proposed release would be inadequate and recommended a more variable year-round release which mimics the natural variation in the hydrograph. The Cohoke Club's recreational fishing for bass, crappie, brim, catfish and perch in the Cohoke Millpond could be adversely impacted by changes in water quality and decreased freshwater input into the millpond. The reduced freshwater flow from Cohoke Creek into the Pamunkey River coupled with the reduced freshwater flow from the Mattaponi River could change the salinity at the confluence of the two rivers and affect the location of the freshwater/saltwater interface in the Pamunkey River as well.

(b) Assessment of Proposed Cohoke Creek Flow-By Requirements: Regardless of the release schedule implemented for the King William Reservoir, the mere fact that a dam would be placed across Cohoke Creek assures that the existing flow regime and associated processes would be permanently altered. The Corps public interest review requires that impacts to recreation, navigation, water quality and fisheries be minimized through the maintenance of minimum stream flows. The following is the District's evaluation of the flow-by requirements for protection of these resources in Cohoke Creek below the proposed KWR-IV dam.

In a 1995 paper entitled "Downstream Ecological Effects of Dams," Ligon, Dietrich, and Trush stated that by changing the flow of water, sediment, nutrients, energy and biota, dams interrupt and alter most of a river's important ecological processes. They suggest that geomorphological changes are the key to understanding the long-term ecological consequences of dams and other stream disturbances. In order to fully understand the geomorphology of the pre and post- dam ecosystem, they recommended that researchers characterize and quantitatively describe both the channel and the watershed, monitor the water and sediment discharges, develop pre-and post dam sediment budgets and hydrology figures, model the effects of the dam on downstream bed elevation and grain size, and attempt to predict the channel responses to the dam using both theoretical and empirical models. In their paper "Landscape Scale Influences on Stream Habitats and Biota," Richards, Johnson, and Host (1996) concur, stating that the biotic composition of streams is strongly influenced by physical habitat. Once these changes have been characterized, the next important step is mitigating the unavoidable impacts.

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In the 1996 paper entitled “Assessing the Ecological Effects of Habitat Change: Moving Beyond Productive Capacity,” Jones, *et al.* identified a set of four objectives which review the ecological effects of habitat changes. These factors include the maintenance or optimization of fishery resources, the protection and conservation of healthy ecosystems from the effects of human activities, the preservation of pristine or undisturbed natural systems, and the restoration of degraded ecosystems to a healthier state. Each of these factors must be taken into consideration in the design of downstream releases for the King William Reservoir.

White developed a spreadsheet database from an indexed bibliography on stream habitat improvement to identify the frequency of occurrence of subjects related to stream habitat management in his 1996 paper entitled “Growth and Development of North American Stream Habitat Management for Fish.” He identified several major categories which need to be considered in protecting or restoring stream habitat. These categories include stream habitat components (i.e., riparian vegetation, streamflow discharge, channel morphology, aquatic vegetation), stream fauna (invertebrates, fish, beaver, other vertebrates), human activities (sediment runoff/deposition, timber harvest, damming/impoundment), habitat management (streambank stabilization, in-channel structures, vegetation management), habitat assessment (biological survey, in-stream flow needs studies), biological aspects (fish ecology and behavior, habitat quality, riparian ecosystems), physical aspects (hydrologic changes), and other human aspects (land use, recreation, political, aesthetic, and legal). He concludes that consideration of management for ecosystems will permit management of human affairs while allowing these ecological systems to function at their highest level.

The Virginia Department of Environmental Quality, in their Virginia Water Protection Permit dated 22 December 1997, required the following minimum release:

“The permittee shall maintain a minimum release below the dam at Cohoke Creek equal to the median monthly flow of Cohoke Creek at the dam site. The median monthly flows for Cohoke Creek at the dam site shall be calculated as a part of the development of the operations and maintenance manual required for DEQ approval by Special Condition B.7 of the permit. This minimum flowby shall be maintained during filling of the reservoir as well as after the dam is completed and the reservoir is filled.”

This condition was implemented based on the recommendations of the Virginia Department of Game and Inland Fisheries for protection of the downstream habitat resources. The RRWSG objected to this proposal because they felt that it would reduce the safe yield of the reservoir by 3.8 mgd. The Norfolk District, in the evaluation of the project, reviewed the DEQ permit and the following specific details in order to assess the specific requirements that would need to be incorporated into the downstream releases. It should be noted that the RRWSG must comply with the most restrictive conditions of any permit.

The initial flow-by for the KWR-IV location identified in the FEIS (pages 5-17) was 2 mgd during the high flow periods and 1 mgd during the low flow periods. The average stream flow identified in the FEIS (pages 4-19) was 6.2 mgd for the KWR-IV configuration. The FEIS (pages 3-15) also identified the reservoir seepage losses from the King William reservoir to be 2 mgd **which includes both lateral seepage and dam seepage**. Several concerns regarding this flow-by requirement were raised by the federal and state advisory agencies. In March 1998, a revised proposal was submitted to the Norfolk District by the City of Newport News (dated 19 January 1998). This revised proposal slightly modified the releases identified in the Final EIS by adding a 0.5 mgd flow, which is attributed to seepage from the dam, to both

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the higher and lower storage flow-by levels (2.5 mgd during high flow and 1.5 mgd during low flow). The FEIS reported an estimated existing 6.2 mgd average stream flow at the dam site. However, in the revised RRWSG document, the average flow at KWR-IV was reduced to 5.7 mgd.

The revised proposal seems to put the releases in a more favorable light, as the higher pool conditions would result in an effective release of 44 percent of existing average flows and the lower pool conditions an effective release of 26 percent. Utilizing the 6.2 mgd average stream flow as identified in the FEIS, the higher pool conditions result in a 40.3 percent effective release and during the lower pool conditions an effective release of 24.2 percent. The City of Newport News supported their position by utilizing the Tennant Method classification system as outlined in the Tables 4 and 5 below.

**Table 4 - RRWSG's Proposed King William Reservoir Release Schedule
Normal Reservoir Pool Conditions (When Available KWR-IV >=80%)**

Month	Controlled Release (mgd)	Dam Seepage (mgd)	<u>Effective Release</u>		<u>Tennant Classification</u>	
			mgd	% of mean Flow	Low Flow Months	High Flow Months
January	2.4	0.5	2.9	51		Excellent+
February	2.8	0.5	3.3	58		Outstanding-
March	3.0	0.5	3.5	61		Outstanding+
April	3.0	0.5	3.5	61		Outstanding+
May	2.3	0.5	2.8	49		Excellent-
June	1.5	0.5	2.0	35	xcel to Outstand	
July	1.5	0.5	2.0	35	xcel to Outstand	
August	1.3	0.5	1.8	32	Excellent+	
September	1.2	0.5	1.7	30	Excellent	
October	1.3	0.5	1.8	32	Excellent+	
November	1.4	0.5	1.9	33	xcell to Outstand	
December	2.4	0.5	2.9	51		Excellent+

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**Table 5 - Drawdown Reservoir Pool Conditions
(When Available KWR-IV Volume < 80%)**

Month	Controlled Release (mgd)	Dam Seepage (mgd)	<u>Effective Release</u>		<u>Tennant Classification</u>	
			mgd	% of mean Flow	Low Flow Months	High Flow Months
January	1.2	0.5	1.7	30		Fair
February	1.4	0.5	1.9	33		Fair-Good
March	1.5	0.5	2.0	35		Fair-Good
April	1.5	0.5	2.0	35		Fair-Good
May	1.2	0.5	1.7	30		Fair
June	0.7	0.5	1.2	21	Good+	
July	0.7	0.5	1.2	21	Good+	
August	0.6	0.5	1.1	19	Good –	
September	0.6	0.5	1.1	19	Good –	
October	0.7	0.5	1.2	21	Good +	
November	0.7	0.5	1.2	21	Good +	
December	1.2	0.5	1.7	30		Fair

Unfortunately, the RRWSG's interpretation of the percent flows from the Cohoke Creek release do not correspond to the flow regimes outlined by Tennant and the rationale for the use of above 80 percent and below 80 percent of the volume of the reservoir has not been fully explained. The District is reluctant to base downstream releases on the amount of water in the reservoir but would rather relate downstream releases to the actual flow regime of Cohoke Creek or its surrogate.

**Table 6 - Instream Flow Regimes for Fish, Wildlife, Recreation, and Related
Environmental Resources based on Tennant (1975)
Recommended Base Flow Regimens % of Mean Annual Flow (MAF)**

Narrative Description of Flows	October - March	April - September
Flushing Flow	200%	200%
Optimum Range	60-100%	60-100%
Outstanding	40%	60%
Excellent	30%	50%
Good	20%	40%
Fair	10%	30%
Poor to Minimum	10%	10%
Severe Degradation	0-10%	0-10%

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The City of Newport News identified low flow months from June to November and high flow months from December to May while Tennant utilizes April to September and October to March as its basis of evaluation. The Virginia State Water Control Board (VSWCB) Minimum In Stream Flow Study (1986) recognized the Tennant Method as a viable tool in the development of flow assessments for aquatic habitat. This study, however, cautions that although the Tennant Method is not a true desktop method, it is frequently used with no additional field assessment. Table 2-2 of the report is shown above which specifically outlines the base flow regimes of the Tennant Method. VSWCB (1986) further states that much of the early research used to develop the method was conducted on eastern streams and that rivers flowing in physiographic provinces with characteristics similar to Virginia were included in the information base on which the method was founded. The VSWCB Minimum Instream Flow Study acknowledged that it would be appropriate to specifically match flow recommendations to the critical periods in the life history of fishes present in the stream and cautioned against merely dividing the year into two 6 month periods that correspond to the wetter and dryer halves of the year because the critical biological periods do not necessarily coincide with the high or low flow periods in the Commonwealth of Virginia.

Specific concern was raised by the federal and state agencies over the blueback herring migration patterns in Cohoke Creek. The VSWCB report outlines the period of April to May for adult upstream migration, May to June for adult downstream migration, and June to October for juvenile downstream migration. For the non-tidal areas above the millpond dam, the species identified include bluegill, largemouth bass, shiner, and dace (FEIS, Table 4-45B). The VSWCB study identifies the spawning periods of the species as follows:

<u>Species</u>	<u>Spawning Period</u>
Bluegill	May-August
Largemouth Bass	April-June
Shiner	May-July
Blacknose Dace	May-June

In order to assess the fishery-related needs of the Cohoke Creek basin, it would be most appropriate to utilize a flow period of April to October and November to March as the basis of a Tennant Methodology review. Under this scenario, the proposed releases by the RRWSG would result in a classification of Excellent to Outstanding from November to March and Fair to Outstanding from April to October under the 80 percent reservoir volume. Under the less than 80 percent reservoir volume, the classification changes result in a good to excellent rating from November to March and a Poor to Minimal ranking for most of the April to October period. I have determined that this period is critical for anadromous fisheries below the Cohoke Millpond dam; therefore, consideration of higher flows must be undertaken.

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Table 7 - Modified Tennant Rating for Proposed Cohoke Creek releases utilizing the District's Revised Flow Regime, RRWSG Data and Tennant Ratings

Month	% of mean flow at $\geq 80\%$ Volume	Tennant Rating		% of Mean flow at $< 80\%$ Volume	Tennant Rating	
		High Flow Month	Low Flow Month		High Flow Month	Low Flow Month
January	51	Outstand.		30	Excellent	
February	58	Outstand.		33	Excellent	
March	61	Optimal		35	Excellent	
April	61		Outstand.	35		Fair
May	49		Good	30		Fair
June	35		Fair	21		Poor/ Minimal
July	35		Fair	21		Poor/ Minimal
August	32		Fair	19		Poor/ Minimal
September	30		Fair	19		Poor/ Minimal
October	32		Fair	21		Poor/ Minimal
November	33	Excellent		21	Good	
December	51	Outstand.		30	Excellent	

Concern has also been raised regarding the lower flow levels to the existing Cohoke Millpond. The proposed King William Reservoir dam would affect roughly half of the Cohoke Creek watershed and would reduce the volume of water entering the Millpond by approximately two thirds using the RRWSG's proposed flowby. This in turn would reduce the flow over the spillway from approximately 3,500 gallons of water per minute to approximately 1,200 gallons per minute under normal conditions. This raises additional concern over potential salinity changes in the Pamunkey River due to this reduction in freshwater input to the tidal portion of Cohoke Creek.

As there was no gauge in place on Cohoke Creek at that time, DEQ recommended that the RRWSG utilize a surrogate gauge in order to mimic the conditions at Cohoke Creek. During a meeting with DEQ, the RRWSG was given an option of three potential surrogate gauges including Totopotomy Creek, Cat Point Creek, and Piscataway Creek. Totopotomy Creek has the lowest mean annual flow per square mile of drainage which would tend to show any potential downstream releases in the most favorable light, reflect a higher percentage of the mean annual flow, and rate higher on the Tennant Method scale. The use of Totopotomy Creek may, therefore, not be the appropriate surrogate to measure downstream impacts at Cohoke Creek.

The Virginia Department of Environmental Quality review of the RRWSG's revised flow-by plan identified many of these discrepancies. Their 14 April 1998 letter discussed the misinterpretation of the

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Tennant figures which results in a lower rating than specified by Newport News in their January 1998 revised flow-by proposal. DEQ assumed that the applicant would do everything possible to eliminate seepage, and then in the interest of dam safety, install a toe drain to collect whatever water did get through the dam. DEQ recommended that the Norfolk District consider requiring a specified flow in Cohoke Creek immediately below the dam. This would take seepage into account and also require releases to accurately reflect the pre-construction flow regime. The conclusion of DEQ was that requiring higher downstream releases would be appropriate in order to minimize downstream impacts, protect existing in-stream uses, and comply with State Water Control Law.

The federal advisory agencies also expressed concerns regarding the acceptable minimum flow-by requirements for Cohoke Creek. In a 14 April 1997 letter to DEQ, the U.S. Fish and Wildlife Service expressed concern over the quality and quantity of water released into the downstream Cohoke Millpond. They recommended a more variable year round release which mimics the natural variation in the hydrograph (flood flows, normal high flows, low flows) in order to protect over 100 acres of wetlands below the dam that would be affected by alteration of quantity, duration, and seasonality of the flows. This position was echoed in the Service's letter to the Norfolk District, dated 25 July 1997. The Service recommended that if the applicant intended to replicate natural variability, that they examine monthly flow durations and the seasonality, duration, and magnitude of annual and infrequent pulses.

In a letter to the District dated 18 July 1997, the Virginia Department of Conservation and Recreation (DCR) also questioned the proposed KWR-IV dam release scenario as it would not mimic the natural Cohoke Creek streamflows due to the limited amount of water which would be released from the reservoir. They recommended that the project mimic the pre-project flows since the wetlands downstream of the dam and the fisheries would likely be affected by any changes in the hydrologic cycle. DCR recommended that Cohoke Creek be monitored and that any releases from the reservoir follow the natural hydrograph established through the sampling protocols.

A meeting of the federal and state advisory agencies and representatives of the RRWSG was held on 1 October 1998. This meeting was scheduled to discuss the differences between the current RRWSG proposal and the natural flow release requested by the federal agencies. VDGIF discussed the rationale for the median monthly flow condition incorporated into the DEQ permit in order to balance the in-stream and off-stream uses. Consideration was given to habitat, assimilation capacity, and navigation issues related to the stream. The flow requirements necessary for sustaining aquatic life depend on both the size of the stream and the depth. The larger the stream, the lower the percentage of the average annual flow there is needed to sustain aquatic life. The 20 percent mean annual flow was initially considered but determined by DGIF to be unrealistic based on the downstream characteristics. The RRWSG produced a revised proposal which took into account an additional 0.5 MGD seepage loss from the dam to supplement flows to Cohoke Creek. The U. S. Fish and Wildlife Service reiterated their concerns and again recommended a natural flow scheme where inflow equals outflow, subject to a range of acceptable variation in order to capture both the low flow and high flow events within the waterway. This would allow RRWSG to maintain the hydrology of the beaver dams and protect the wetlands downstream of the proposed dam site. A suggestion was made to place a gauge in Cohoke Creek immediately so that data could be collected to refine the flows.

By letter dated 30 March 1999, the RRWSG presented a revised downstream release flow proposal. The revised plan would provide the estimated flow at dam site KWR-IV if the reservoir were not present or the estimated median monthly flow required by the DEQ permit if the estimated natural flow were greater

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than the median monthly flow. Although this proposal would more closely mimic the stream under low flow conditions, it does not allow for the short-term, high flow conditions represented by a rainfall or runoff event. I believe this high flow period contributes to maintaining the downstream aquatic resources.

A meeting of the federal and state advisory agencies was held on 15 May 1999 to discuss the flow-by alternatives presented by the RRWSG. The group reached consensus that the latest proposal by the RRWSG would not be acceptable as it would continue to discount high flow events which may be critical to sustaining downstream aquatic resources. The group also questioned the varying seepage figures presented by the RRWSG and determined that any solution would need a refined figure on seepage from the dam and options available to the RRWSG to control such water loss. The group also felt that a time series analysis would need to be performed to determine when the 80 percent water level in the reservoir would be contravened. The median monthly flows were determined to be less reliable because they masked the high and low flow conditions which may be critical to the downstream resources. Several suggestions were made on methods to protect the high flow events including peak flows to flush the waterway and mimic natural high flow events and the utilization of Totopotomy Creek flows associated with precipitation data in the vicinity of the reservoir.

The RRWSG proposal focuses on the protection of downstream fisheries. In utilizing the modified Tennant Method, the RRWSG assumes that fisheries resources take precedence over other stream resources. As stated in comments by both the U.S. Fish and Wildlife Service and the U.S. Environmental Protection Agency, there are significant wetland resources downstream of the proposed KWR-IV dam site. The aquatic resources below the proposed dam are driven by supporting hydrology from the millpond, beaver activity and the remainder of the watershed. I believe that mimicking the natural flow regime is an important consideration in determining the flow-by requirements to sustain these areas.

To provide a methodology for mimicking the natural flow regime that could be incorporated into the design plan, there must be an acceptable range that could be met by the RRWSG. The group determined that a 10 percent variation would be appropriate. The group also determined that the measurement time must be small enough to capture the flow differences, yet long enough to be practical. Since the effort is based on a need for the high flows, a 3-day running average was suggested which would capture the high flows and would not mask these flows to a great extent. The daily range would be within 15 percent of this average while the monthly average would be within 10 percent of the established flow. In addition, the group determined that the high flow matches would be waived should the RRWSG implement a mandatory water restriction for their customers. The longer monitoring can be performed in Cohoke Creek, the easier it will be to establish a unit hydrograph for the watershed. The use of Totopotomy Creek as a surrogate was discussed by the group. Since Totopotomy Creek represents a much higher drainage basin, the group concurred that it would be preferable to establish an adjacent watershed as the surrogate. It would be much more likely that events in an adjacent watershed would more closely mirror conditions in Cohoke Creek. Through the establishment of baseline conditions for both rainfall and runoff in both waterways, it would be appropriate to develop a hydrograph that would reflect natural conditions prior to dam construction.

The RRWSG supplied their analysis of the proposed discharges with respect to Section 404 (b)(1) of the Clean Water Act in November 2000. In their analysis, they state that the conditions imposed by the Virginia Water Protection Permit are equal to the median monthly flows of Cohoke Creek at the dam site along with the hydrologic influence of the reservoir and would effectively eliminate any potential dewatering of the downstream wetlands. The revised RRWSG plan discussed above would provide a

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more natural flow regime; however it still neglects to take into account the high and low flow regimes that both the Virginia Department of Game and Inland Fisheries and the U.S. Fish and Wildlife Service have identified as being critical to the ecological health of the downstream resources. The RRWSG also proposes to incorporate a multilevel release to protect downstream water quality. Although this condition would aid in the protection of water quality, the District and the advisory agencies continue to emphasize that the volume of water released to the downstream system is vital to maintenance of the wetland ecosystem downstream of the King William reservoir. Ideally, the downstream releases would mimic natural conditions. The most recent proposal by the RRWSG continues to emphasize a set flow rather than the fluctuating flows requested by the District and other federal and state advisory agencies.

In conclusion, I recommend that downstream releases be based on the natural flow regime of Cohoke Creek. The District staff has determined that the information collected at the Cohoke Creek gauge currently being monitored by the RRWSG and the collection of rainfall data in the vicinity of the proposed reservoir would be required in order to establish the downstream releases. The District could then develop a unit hydrograph which is based on precipitation that falls on the basin and then establish a simple model to determine stormflow hydrographs. This data would also aid the District in a final determination of the adequacy of utilizing Totopotomoy Creek as a surrogate for flows in Cohoke Creek. It would also allow the District and the Virginia Department of Environmental Quality to develop a flow regime which would approach the natural variation currently found in Cohoke Creek while minimizing the impact to the reservoir. The methodology would include a 3-day running average to capture the high flows, a daily range within 15 percent of this average and a monthly average within 10 percent of the established flow criteria. The high flow matches would be waived should the RRWSG implement a mandatory water restriction for their customers. (For a detailed discussion of this issue, see the District's "Assessment of Proposed Cohoke Creek Flow-by Requirements for the King William Reservoir Project.")

A number of comments were received from the City of Newport News regarding Cohoke Creek downstream releases. They stated that the Norfolk District erred in using a 6.2 mgd average Cohoke Creek flow at King William Reservoir dam site IV, since the 5.7 mgd estimate of mean flow is the more recent estimate presented in the project record. The estimate of 6.2 mgd average flow was provided by the applicant and cited in the FEIS (page 4-19). The RROD does acknowledge, however, that the estimate of average flow in Cohoke Creek has been reduced. Page 52 of the RROD states, "...in the revised RRWSG document, the average flow at KWR-IV was reduced to 5.7 mgd."

The City of Newport News also stated that the Norfolk District "grossly errs" in its claimed downstream flow reduction, as, throughout the RROD, the District bases its conclusions about Cohoke Creek downstream impacts on the "mistaken" claim that a two-thirds reduction in flow volume would occur. They stated that the VWPP requires that minimum releases equal median monthly flow at the dam site, which equates to an average release of 4.0 mgd; a 31% flow reduction, not a 67% reduction. They further stated that the Norfolk District's error is so large that the District's conclusions with respect to potential downstream impacts cannot be considered credible. Again, the information evaluated and presented in the RROD comes from the FEIS and the applicant's permit application. As stated in the RROD, the applicant has objected to the VWPP permit condition that stipulates downstream releases, therefore, there is no guarantee that it will not be modified in the future. Furthermore, the median monthly flows calculated for the DEQ permit do not take into account high and low flow conditions that may be critical to downstream resources. Citing the "average" of 4.0 mgd, which may appear on the surface to reduce adverse affects, obscures the fact that the proposed release ranges from 19 to 61 percent of the pre-project

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streamflow, as cited by the City in their comments on the RROD. For example, the September release is 1.3 mgd, which is only 22% of estimated mean flow and results in a Tennant rating of “poor to minimum.” It should be noted that September is part of a critical migration period for anadromous fish. In fact, according to the information presented by the RRWSG, even using the state mandated minimum releases, July through October are classified as either fair or poor. Furthermore, the District’s recommendations that higher downstream releases are necessary is supported by state and federal advisory agencies, as reported in the RROD, page 57. DEQ commented, in response to the RROD, that they are willing to consider alternate proposals that replicate the high flow and drought events using a range of variability approach, as advocated by the Norfolk District.

The City of Newport News reiterated that the state-permitted median monthly flow releases from the reservoir should be used as the basis for Norfolk District’s evaluation. They concede that they proposed less restrictive release schedules in their Joint Permit Application, however, they believe this is irrelevant to the decision at hand as the Norfolk District has recognized that the RRWSG must comply with the most restrictive permit conditions. As I have stated in other sections, while the permittee must comply with the conditions of the VWPP, I am required to review a permit application as it is submitted to me and I must rely on the information provided by the applicant regarding their desired outcome for the project. Furthermore, shortly after DEQ issued their VWPP, the RRWSG filed suit against DEQ seeking relief from the more stringent downstream flow release volumes imposed by the VWPP. A ruling by the Newport News Circuit Court upheld the DEQ permit conditions and the City of Newport News did not appeal the decision, but indicated that they would pursue changes to the permit when it is re-issued in 2007. This provides clear evidence that the RRWSG was desirous of removing the imposed restrictions and returning to the discharge volumes and rates they applied for in their permit application. If the City of Newport News had modified their application to reflect the conditions outlined in the VWPP, I would have evaluated the proposal based on those changes.

The City of Newport News cited a document they prepared entitled, “Comparison of King William Reservoir Project with Recently Permitted Reservoirs in the Southeastern United States,” which was submitted to the Norfolk District in August, 1999. This document summarizes information on four large reservoir projects permitted during the 1990s by the Corps’ Wilmington and Savannah Districts. The City of Newport News compared the minimum reservoir releases authorized for those projects and stated that the King William Reservoir minimum releases are far greater than all of these. The City appears to imply that the King William Reservoir minimum releases should be reduced because other reservoirs did not have such stringent requirements. As stated on page 176 of the RROD, each project has its own unique need, environmental impacts, socioeconomic issues, agency concerns and project alternatives; and a comparison of different projects is typically inappropriate.

Newport News stated that the Norfolk District inconsistently applied Tennant Ratings of instream flow regimes, and discounted an alternative method used by Malcolm Pirnie. They stated that Malcolm Pirnie made a “slight one-month shift in the two six-month periods” (identifying high flow and low flow months) “to more closely match seasonal hydrologic conditions in eastern Virginia.” The City of Newport News stated that the Norfolk District defines the “high flow” months as April through October, “despite the well known fact that the lowest flows in eastern Virginia typically occur during the summer and early fall period encompassed by these months.” Contrary to the City’s assertions, however, Norfolk District clearly defines the period of April through October as low flow months (RROD, page 55). The District selected the six month period of April through October to represent the low flow months, rather than June through November, as identified by the RRWSG or April through September, as used by

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Tennant, based on the critical periods in the life history of fishes present in the stream. This is consistent with the findings in the VSWCB Minimum Instream Flow Study (1986).

The City of Newport News commented that the Norfolk District considered Tennant Ratings of various possible King William Reservoir release schedules, yet ignored Tennant Ratings under the State-permitted median monthly flow release schedule. They included their own table summarizing how the state-mandated release schedule would rate in terms of instream flow regime, and conclude that “the required median monthly flow releases would preserve an instream flow regime far superior to that portrayed in the RROD.” The table submitted by the City in their comments (page 20) has misinterpreted the District’s position on the Tennant Method analysis. Table 7 in the RROD (page 55) classifies the months of November to March as the High Flow months and April to October as the low flow months, which is opposite of the table in the RRWSG analysis, which erroneously indicates that the “Norfolk District High Flow Months” are April through October. If presented accurately, July would be considered in the District’s analysis as a low flow month and the 34 percent mean flow would be considered “fair,” not “fair to good,” as indicated in RRWSG’s table. In September, the 22 percent estimated mean flow should be considered “poor” rather than “fair” as stated by the RRWSG. The RRWSG correctly stated that the flow would be in the Optimum Range from November to May, although they have misinterpreted the District’s findings and represent these months as “low flow” rather than “high flow,” as indicated in the RROD (Table 7, page 55). Furthermore, the RRWSG analysis is based on average flows and does not take into account drought conditions. In addition, it shows that the downstream releases do not result in better than fair conditions during critical larvae and downstream migration periods.

The City contends that the Norfolk District ignores the fact that natural basin runoff would still occur from the additional 7.4 square miles of watershed that drains to Cohoke Millpond below the KWR-IV dam site and that “this runoff would substantially increase downstream flows above the level provided by King William Reservoir releases and seepage losses.” They stated that if the runoff from the remaining 7.4 square miles of Cohoke Millpond drainage area (of the 16.3 square mile drainage area before the reservoir) was counted, then the average flow post-project would only be 17% less than the pre-project flow estimate. Certainly, some runoff from the undisturbed portions of the watershed downstream of the KWR-IV dam would make its way downslope to the lower reaches of the drainage basin. It is not known exactly how much water actually would reach Cohoke Creek, or at what point along its length, and this issue was not addressed in the FEIS or any of the numerous studies submitted by the RRWSG or its consultants. My concerns are with wetlands and fish and wildlife resources, some of which are directly downstream of the dam. Substantial quantities of runoff would not be expected to instantaneously appear directly below the face of the dam. However, the RRWSG has provided no detailed information on the drainage characteristics of the watershed.

The City of Newport News contends that the Norfolk District ignores the fact that the King William Reservoir would be full “most of the time” and would therefore release more than median monthly flows during high flow periods when spills due to high natural basin runoff exceed state-mandated median monthly flow releases. They believe that this would reduce the average flow reduction at the dam site to even less than a 31% flow reduction. According to a Malcolm Pirnie study, the reservoir is projected to “still be full in 59 percent of the simulated months.” Consequently, they argue that there would be a significant portion of time in which King William Reservoir spills would exceed the required downstream releases. The numbers calculated by the RRWSG demonstrate that averaging values of this type has limited ecological relevance. As stated on page 58 of the RROD, both the VDGIF and the Service have

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identified high and low flow regimes as being critical to the ecological health of the downstream resources, and these are not addressed by averaging flows throughout the year. The City's own analysis of downstream releases, which is provided in their comments on the RROD, indicate that even the state-mandated flow regime would result in flows that are between 19 to 61% of the pre-project streamflow, and the lower stream flows result in poor or fair Tennant ratings and occur during critical periods in the life histories of fish present in the stream.

The City commented that the Norfolk District has also ignored the fact that the state-mandated median monthly flow releases from the King William Reservoir would substantially exceed natural Cohoke Creek flow levels that would normally occur during drought conditions. They estimate that Cohoke Creek flows at the KWR-IV dam site would have averaged 1.1 mgd over the six-month period of June 1981 through November 1981. In comparison, the state-permitted release schedule would average 2.2 mgd over these six months, or 100% more than would have naturally occurred in a drought without the reservoir. This raises another issue: that of the dam resulting in further alterations of the natural hydrologic regimes in the Cohoke Creek watershed. In the RROD, the District recommended that downstream releases be based on the natural flow regime of Cohoke Creek. Natural variation, including that accompanying droughts, is important to the ecological health of stream and wetland systems. The District, in consultation with state and federal resource agencies, has recommended a flow regime with a daily range within 15% of the 3-day running average and a monthly average within 10% of the established flow criteria. As discussed on page 58 of the RROD, increasing the flow by 100% during droughts does not "mimic natural conditions," and may not be a benefit to the aquatic ecosystem.

The City of Newport News stated that the District also ignores the state permit requirements in making the claim that downstream water quality problems and associated fish kills could result from the release of water from the lower levels of the King William Reservoir. They stated that the VWPP specifically requires that releases from the King William Reservoir to Cohoke Creek not cause the violation of water quality standards for dissolved oxygen, temperature or pH. The RRWSG has also proposed in its Joint Permit Application that intakes for the downstream release of water would be located at elevation 80, 65 and 45 feet msl, which would provide flexibility to ensure that downstream water quality is protected. It is acknowledged on page 58 of the RROD that this condition would aid in the protection of water quality. While this may minimize adverse effects of the impoundment on water quality released downstream, the reservoir would not improve water quality in Cohoke Creek above existing conditions, as claimed by RRWSG (RROD page 50).

The City of Newport News believes that Norfolk District errs in stating that there is no documentation of the difference between 2 mgd and 0.5 mgd seepage rates. They stated that an explanation of lateral seepage losses and dam seepage losses is presented in Report D of the FEIS and in a Malcolm Pirnie report. They contend that dam seepage losses have consistently been estimated as 0.5 mgd by the RRWSG and were never estimated as 2 mgd as implied in the RROD. Page 52 of the RROD states "The FEIS... also identified the reservoir seepage losses from the King William Reservoir to be 2 mgd." This includes lateral seepage and dam seepage. This section of the Final RROD has been revised to clarify that the 2 mgd total seepage loss includes lateral seepage and dam seepage. As stated on page 56 of the RROD, DEQ has assumed that the applicant would do everything possible to eliminate seepage and, in the interests of dam safety, install a toe drain to collect whatever water did get through the dam. Therefore, I do not believe that as much as 0.5 mgd would escape these efforts and be transported into Cohoke Creek.

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The City of Newport News complained that the Norfolk District held an interagency meeting on 15 May 1999 to discuss downstream releases, and did not notify or invite the RRWSG, despite their having provided a detailed report on the subject that responded to prior agency comments. They stated that the RRWSG would have been able to address agency misunderstandings, had they been informed. As indicated by the City, the Norfolk District indeed met with federal and state resource agencies. The RRWSG was not notified, as this was an internal interagency work session. While extensive efforts were made to include the RRWSG in many interagency meetings, it is impractical and inappropriate for a federal regulatory agency to conduct all of its business in the presence of its permit applicants.

Finally, the City contends that the Norfolk District, in recommending an even more “generous” King William Reservoir release schedule that includes “high flow matches,” has ignored the impact of these releases. They stated that the high flow matches would accelerate depletion of the reservoir and the existing Newport News Waterworks reservoir system storage during drought periods, delay refill of the reservoir system storage during recovery periods and require larger Mattaponi River withdrawals to make up the difference to maintain adequate safe yield benefit from the project. Furthermore, they reiterated their previous claim that even without a high flow release requirement, the King William Reservoir would be full most of the time and, therefore, reservoir spills would already provide high flow matches “most of the time.” The District has made it very clear, and has repeatedly stated in the RROD, that natural downstream flow regimes, including high and low flows, should be maintained.

Newport News City Manager Ed Maroney also submitted comments regarding downstream releases. He stated that the RROD advocates the requirement to release water from the reservoir in order to keep downstream wetlands artificially wet during dry periods. Furthermore, he stated that this would accelerate depletion of the reservoir during critical drought periods and delay recovery. Contrary to Mr. Maroney’s assertion, the District seeks to maintain natural flow regimes that would mimic existing conditions in the wetlands downstream of the reservoir. This flow regime actually decreases the releases during low flow periods and encourages the replenishment of the reservoir with water from the Mattaponi River when flows are higher. Mr. Maroney’s second comment is addressed in my response to City’s comment, above.

(4) King William Reservoir Watershed: In December 1996, a citizen group opposing the reservoir project reported to EPA that before it was closed in April 1995, the 85-acre King William Landfill (#505) had received several loads of pulp waste from the Chesapeake Corporation paper processing plant. Landfill #505 is located within the watershed of the proposed King William Reservoir at the intersection of Route 30 and Route 640 in King William County. Because bleached pulp waste is known to contain dioxin, EPA’s Region III Emergency Response Center performed sampling to determine if any imminent and substantial threat to public health, welfare or the environment existed from potential dioxin contamination at landfill #505 and to determine if a removal action was necessary. EPA collected and tested a total of six water samples from monitoring wells and leachate tanks on 24 January 1997.

A monitoring well system is located around the perimeter of the landfill and routine sampling has demonstrated compliance with the landfill permit and all Virginia Solid Waste Management regulations. Also, EPA was informed that all wastes deposited in landfill #505 by the Chesapeake Corporation met the criteria of an approved non-hazardous waste and that all bleached paper products generated within the pulp and paper operation are recycled back into the pulp and would not have been included in the material deposited at the King William landfill.

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Although the most toxic 2,3,7,8-tetra chlorinated dibenzo-p-dioxin (2378-TCDD) was not detected, 4 of the 6 locations showed parts per quadrillion levels of octachlorinated dibenzo-p-dioxin (OCDD), the least toxic isomer of dioxin. EPA determined that the concentrations found do not require a removal action and the risk associated with the current levels of OCDD do not approach any levels of concern for drinking water from the King William Reservoir, should it be built.

Despite EPA's determination that landfill #505 poses no concern for dioxin, on 20 June 1997 the Institute for Public Representation, on behalf of the Mattaponi Tribe, requested that EPA investigate more fully the potential impact of dioxin hazards on the King William Reservoir project and the Mattaponi Tribe. In response to this request, EPA Region III's Resource Conservation and Recovery Act program sampled all of the wells in the groundwater monitoring network around landfill #505 on 24 and 25 February 1998. The results of the sampling confirmed the earlier conclusion that dioxin is not a problem at the landfill or for the proposed King William Reservoir.

The final landfill cap is expected to limit surface water infiltration and minimize leachate generation. Since the groundwater table aquifer is thought to flow in a southwesterly direction toward Cohoke Creek, any leachate leaving the landfill should flow towards the reservoir. State regulations require water quality monitoring both during operation and after closure of landfills. Should it become necessary, the RRWSG has proposed a number of corrective actions to prevent any leachate-contaminated groundwater from reaching the reservoir. Among these methods are: the construction of a slurry wall, groundwater interceptor ditches and buried drains, groundwater recovery wells and rerouting of surface drainage away from the reservoir, and full removal of the disposed materials.

In January 1999, as a part of the evaluation of potential dioxin contamination, EPA contracted with the Corps of Engineers Philadelphia District to develop a 2-dimensional groundwater model to assess the potential effects of the construction of the proposed reservoir on groundwater flow near the landfill. The hydraulic divide was previously assumed to be coincident with Route 30. However, based on a review of historical water level data for that landfill, the modeling results show that due to the flat topography in the area, the hydraulic divide may currently move back and forth beneath the landfill with seasonal variations in precipitation and recharge. In the model, the presence of the proposed reservoir could move the hydraulic divide westward by as much as 200 feet.

Therefore, it is anticipated that there may be an alteration of the existing groundwater flow patterns (along with an increase in lateral seepage out of the reservoir) due to the rise in water table elevation in the Cohoke Creek watershed as a result of the proposed reservoir. Groundwater recharge is expected to increase in the vicinity of the reservoir. However, based on their sampling, EPA has determined that dioxin does not pose a problem to groundwater quality surrounding the landfill or to water quality within the King William Reservoir, should it be built.

In their 25 July 1997 letter, EPA recommended that the Corps require groundwater quality monitoring and mitigation, specifically for dioxin, to ensure that the landfill does not impact the water quality of the reservoir or endanger groundwater wells in the area. DEQ has since determined that the current landfill monitoring system is adequate as it has both upslope and downslope wells that monitor groundwater quality surrounding the landfill. Based on DEQ's findings, EPA no longer recommends that the District require additional monitoring wells.

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f. Fish and Wildlife Resources:

(1) Habitat Description:

(a) Cohoke Creek System: Cohoke Creek is a low-gradient stream system that lies in a deeply incised valley between the Mattaponi and Pamunkey Rivers. The Cohoke Creek watershed includes a diverse wetland complex, mature and immature forests, free-flowing streams and beaver ponds. The 1,526 acres of wetland and upland system that would be impacted by the King William Reservoir (KWR-IV) consists of 114 acres of coniferous forest, 618 acres of mixed coniferous/deciduous forest, 87 acres of mature cove hardwood forest, 270 acres of early successional logged forest, and 403 acres of vegetated wetlands, 34 acres of shallow open water communities, and 21 miles of perennial and intermittent streams which comprise 64 different cover types and hydrologic regimes.

The project area is generally undisturbed except for silvicultural activity. Although heavily logged in some areas, the site contains large expanses of wetland and upland forests. These upland and wetland communities provide valuable and diverse habitat for fish and wildlife and support a wide variety of aquatic, semi-aquatic and terrestrial species. The functions and ecological value of these communities are enhanced by their juxtaposition and interspersions. For instance, the large diameter trees and snags in the mature forests provide habitat for cavity nesters such as the barred owl and pileated woodpecker, and the surrounding contiguous forests provide sufficient expanse for their home ranges.

The diverse wetland complex at the site accounts for over thirty of the cover types and hydrologic regimes present and is a mixture of palustrine forested, scrub-shrub and emergent wetlands. Typical species found in non-tidal forested wetlands at the proposed reservoir site include red maple (*Acer rubrum*), smooth alder (*Alnus serrulata*), bayberry (*Myrica cerifera*), sycamore (*Platanus occidentalis*), river birch (*Betula nigra*), and silky dogwood (*Cornus amomum*). Dominant species in palustrine forested/scrub-shrub wetlands include smooth alder, bayberry, silky dogwood, and buttonbush (*Cephalanthus occidentalis*). Dominant species in palustrine emergent wetland at the site include sedges (*Carex* spp.), soft rush (*Juncus effusus*), arrow arum (*Peltandra virginica*), sensitive fern (*Onoclea sensibilis*), switch grass (*Panicum virgatum*), smartweed (*Polygonum* spp.), pickerelweed (*Pontederia cordata*), woolgrass (*Scirpus cyperinus*), bulrush (*Scirpus* spp.), marsh fern (*Thelypteris palustris*), and broad-leaved cattail (*Typha latifolia*). Cove hardwood forests are older deciduous forests typically found at the heads of ravines and on slopes in the stream valleys and are composed mainly of beech (*Fagus grandifolia*), oak (*Quercus* spp.) and hickory (*Carya* spp.). These types of communities are rare in logged areas and provide extremely high quality wildlife habitat. Due to their age and landscape position, these communities are very difficult to replace or re-create. Rather than showing low aquatic diversity and abundance functions as claimed by the City of Newport News, the various wetland diversity analyses indicated that the proposed impoundment area of Cohoke Creek includes a structurally complex and diverse wetland system providing multiple valuable ecological functions.

(b) Mattaponi River System: The Mattaponi River joins the Pamunkey River at the town of West Point to form the York River. The Mattaponi River supports extensive and diverse riparian wetland communities classified as tidal freshwater (0.0 to 0.5 ppt) at the headwaters to oligohaline (0.5 to 5.0 ppt) at the mouth. These tidal freshwater wetlands provide habitat for rare plant species and migratory waterfowl, support an important shad fishery and serve to protect water quality in the Chesapeake Bay. An extensive tidal freshwater marsh known as Garnetts Creek Marsh is located on the North shore of the Mattaponi River directly across from the proposed intake site. Typical herbaceous species found in the

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marsh include pickerelweed (*Pontederia cordata*), arrow arum (*Peltandra virginica*), spatterdock (*Nuphar luteum*), wild rice (*Zizania aquatica*), smartweed (*Polygonum* spp.), tearthumb (*Polygonum arifolium* and *P. sagittatum*), rice cutgrass (*Leersia oryzoides*) and Walter's millet (*Echinochloa walteri*). A small tidal freshwater marsh is located about 600 feet upstream of the intake site on the southern side of the river. This small "pocket" marsh is dominated by sweet flag (*Acorus calamus*), pickerelweed, arrow arum and spatterdock. Colonies of sensitive joint-vetch (*Aeschynomene virginica*), a federally listed threatened plant species, are also found in these two marshes.

The Virginia Department of Conservation and Recreation stated that "The Mattaponi River is one of the most significant natural habitats in the eastern United States." They further commented that the Mattaponi River supports state-significant and exemplary freshwater tidal marshes and swamps and provides important habitat for rare species such as the sensitive joint-vetch and the bald eagle.

(2) Ecological Impacts of the Proposed Work:

(a) Habitat Loss: The project would result in the conversion of 1,526 acres of a highly diverse and productive system of wetlands, forests and streams and their wildlife communities into a far less diverse, open-water lake environment favored by relatively few species. Construction of the reservoir would inundate at least 21 miles of stream channel, 34 acres of open water habitat, 403 acres of vegetated non-tidal wetlands, 875 acres of forested uplands, and 214 acres of early successional forested uplands. The existing wetlands would be displaced by the fill material for the dam or inundated by backflooding. The Norfolk District recognizes that all of the wetlands would not be lost due to fill impacts. However, the functions and values of the existing vegetated wetland complex would be removed.

Restriction of flows from construction of the proposed King William Reservoir dam also has the potential to alter the sustaining hydrologic regime and associated biogeochemical processes of existing non-tidal wetlands located downstream of the proposed reservoir site. Additionally, construction of pipelines to connect the new reservoir to the existing Newport News Waterworks distribution system and provide for the proposed pumpover from the Mattaponi River would result in the permanent conversion of forested wetlands to emergent and/or scrub-shrub wetland cover types. A breakdown of these impacts by cover type for the proposed King William Reservoir (KWR-IV) pool area only is shown below:

34 ACRES VEGETATED WATERS

Open Water 34 acres

403 ACRES VEGETATED WETLAND

Palustrine Emergent 37 acres
 Palustrine Emergent/Open Water 18 acres
 Palustrine Scrub-Shrub 13 acres
 Palustrine Scrub-Shrub/Emergent 63 acres
 Palustrine Scrub-Shrub/Open Water 2 acres
 Palustrine Forested 192 acres
 Palustrine Forested/Emergent 40 acres
 Palustrine Forested/Scrub-Shrub 32 acres
 Palustrine Forested/Scrub-Shrub/Emergent 5 acres
 Palustrine Forested/Open Water 1 acre

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1089 ACRES UPLAND

Mixed Forest 618 acres
Cove Hardwood 87 acres
Early Successional Logged Area 270 acres
Evergreen Forest 114 acres

TOTAL ACREAGE 1526 acres

(SOURCE: Table 2-1, King William Reservoir Project, Habitat Evaluation Procedures, Main Report (Malcolm Pirnie, 1999a))

It is important to note that the currently proposed King William Reservoir would effectively eliminate the entirety of the upper Cohoke Creek headwaters (both vegetated wetlands and unvegetated streams above the dam) as well as a large portion of the mainstem of Cohoke Creek proper and its associated wetlands. Immediately after construction of the reservoir, there would be an artificial system comprised of a large open water body devoid of any upslope natural bordering wetlands.

The City of Newport News has continued to assert that construction of the King William Reservoir would have little if any adverse impact and claims that any impacts that are realized, such as wetland loss, would be easily mitigated and most likely offset by the enormous gain in open water created by the reservoir. The City asserts that the reservoir would not represent a true loss of habitat, but rather only the conversion of habitats; and that the 1,500-acre lake and its 77 miles of shoreline would provide larger and more productive fish and wildlife habitat and better water quality than the natural upland forests, wetlands and streams. They claim that rather than being monotypic, the reservoir itself would provide 1,251 acres of deepwater habitat and 322 acres of shoreline and shallow water habitat for spawning, nursery, nesting, migratory and wintering areas that would be used by waterfowl, wading birds, amphibians and other aquatic organisms. The City expects 200 acres of wetland fringe to develop around the reservoir; and expects that when mature, the upland buffer area around the reservoir would provide greater wildlife habitat than the upland areas impacted by the reservoir. The City also alleges that the existing low dam at Cohoke Millpond already precludes interaction between the Cohoke Creek watershed and the larger Chesapeake Bay ecosystem.

EPA commented that the loss of such a large area of contiguous forest would represent a serious threat to habitat (especially for area-sensitive species) and biodiversity in the area as well as a dramatic alteration of a functioning stream valley ecosystem in the Chesapeake Bay watershed. EPA contends that waterfowl, forest interior bird species and raptors such as the bald eagle presently traverse the existing low dam and utilize the large, uninterrupted tracts of bottomland hardwood and other forested land for migration, feeding and breeding. Impounding Cohoke Creek would eliminate the varied topography and reduce the existing diversity of interspersed habitats. Consequently, the food, cover and reproductive sites for the vast majority of species in the reservoir pool area would disappear. The loss of the natural hydrologic regime would dramatically alter patterns of sediment transport and fish passage, and reduce the exchange and transport of nutrients, detritus and organisms between the channel and the floodplain both above and below the proposed dam. The establishment of a stocked freshwater fishery would not compensate for the impacts of the project to resident fisheries as asserted by the RRWSG. It is also unlikely that the created deep-water habitat would be more valuable than the existing wetlands as claimed by the RRWSG.

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In a letter dated 5 August 1999, EPA stated their belief that the uniqueness/heritage values of the wetland ecosystem that would be lost would not be sufficiently replaced by the open water habitat of a man-made lake. Many of the forested systems, especially bottomland hardwoods and mature cove hardwood areas, have a productivity rate and biological diversity that is well above that of a managed man-made lake. Due to the age and landscape position of the mature cove hardwood areas, the U.S. Fish and Wildlife Service believes they would be extremely difficult to replace or re-create. Although man-made lake environments may be productive at first, the agencies indicated that productivity declines over time. Also, the entire surface of the reservoir would not represent usable habitat as asserted by the RRWSG. While some portion of the surface of the deep-water lake would be utilized by fish or wading birds, it is the shallow water littoral fringes that would be most valuable to fish and other wildlife for breeding and nursery habitat and for cover and foraging. However, water level fluctuations and periodic drawdowns associated with reservoir operation would decrease the habitat value and use of the littoral zone and fringe wetlands by wildlife. EPA stated that "EPA continues to believe it is inappropriate to view these losses as offset by gain in open water habitat as discussed in the May 1999 Plan."

The City of Newport News has stated that the reservoir will remain within one foot of its normal pool elevation for more than 80 percent of the time during its first 30 years and they believe the wetland fringe will be as stable as those at their other reservoirs. However, the proposed King William Reservoir would be at the top of the system and it would have steep slopes down to the waters edge. In addition, Malcolm Pirnie predicted the water elevations would decrease by 10 feet for periods of time and by as much as 25 feet, 40 years after construction. The widely fluctuating water levels, especially in later years of reservoir operations when water demand would be higher, make the sustainability of the fringe wetlands questionable. The duration of drawdown and the time of year are critical, and the advisory agencies believe that the fringe would likely be very small or nonfunctional for a substantial part of the 50-year project evaluation period. The drawdown time was considered one of the greatest limiting factors.

The Norfolk District does not dispute that some vegetated wetland fringe would likely develop along the shoreline of the new proposed reservoir. However, the methods proposed to quantify this area are questionable, the water level fluctuations from future projected use of the King William Reservoir would limit the long-term viability of any vegetated wetland fringe, and such a vegetated wetland fringe would provide relatively few functions in comparison to the existing Cohoke Creek wetlands (i.e., fringe wetlands would be out-of-kind). Although focusing on estuarine wetlands, Childers and Day, in a 1991 paper entitled "The Dilution and Loss of Wetland Function Associated With Conversion to Open Water," present a compelling argument that conversion of a predominantly vegetated wetland system to a more open water system decreases the wetland to open water ratio and effectively dilutes the functions of the remaining wetlands relative to the aquatic system. Childers and Day postulate that in such a scenario "although wetland area would remain, it would be diluted so effectively... that, in an ecological sense, it would be functionally lost to the system." The proposed King William Reservoir would effectively result in the complete loss (inundation) of all wetlands situated upstream of the dam, and any new fringe wetlands that might develop around the reservoir would not be associated with other natural non-tidal wetlands. This would result in a very artificial, functionally depauperate and isolated system in the upper watershed of Cohoke Creek. Any fringe wetlands that might develop would be very narrow in width, and arguably the only viable wetland function they would serve would be as habitat. The habitat provided by the shallow water areas of the proposed King William Reservoir and adjoining vegetated buffer have been quantified and credited by the District's Habitat Evaluation Procedures (HEP) study, and are responsible for most of the habitat credit gains for several of the species evaluated in the study (e.g., beaver, mink, great blue heron, and red-spotted newt).

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Furthermore, the U.S. Fish and Wildlife Service expressed concern that planned development and recreational activities in and around the reservoir would discourage its use by wildlife. According to the 1997 King William County Comprehensive Plan, the area immediately adjacent to the reservoir would be designated as a Resource Protection Area in accordance with the Chesapeake Bay Preservation Act. This would be a 100-foot wide buffer zone around the reservoir in which no buildings, land disturbance activities or clearing would be allowed. The remainder of the watershed is designated as a Watershed Protection Area which is also in the County's Resource Management Area. The RRWSG stated in the FEIS that there would be minimal planned development around the reservoir. However, the 1997 King William County Comprehensive Plan indicates "Moderate residential development is intended within the Watershed Protection Area and at its periphery a narrow area is designated for moderate mixed development of residential, light commercial and planned unit development." Human disturbances from such development would change the rural and agricultural setting of the area, further reduce the habitat available to wildlife and reduce the habitat value of the proposed buffer zone surrounding the reservoir.

Also, public recreational access to the reservoir and surrounding land would significantly decrease habitat value and use by wildlife. The County's recreational plan includes nature trails and picnic areas within the buffer surrounding the reservoir. The presence of picnickers, dogs, bicyclists, motorized bikes and other disturbances in the buffer area would render it of limited habitat value compared to its existing condition and would significantly decrease the quality of habitat for those species less tolerant of human activities.

The project would result in the alteration and potential degradation of 186 acres of wetlands and the wildlife habitat they provide downstream of the proposed dam, as well as 0.8 miles of streambed below the proposed discharge point on Beaverdam Creek. Although the actual physical disturbance to wetlands along the pipeline route would be temporary, the wetlands would be permanently converted. Maintenance of the right-of-way would change the palustrine forest community to an emergent and/or scrub-shrub system and would result in habitat fragmentation. Furthermore, these disturbed areas may become dominated by more tolerant exotic and invasive species such as *Phragmites australis* (common reed), the establishment of which would further degrade the wildlife habitat. The U. S. Fish and Wildlife Service commented that forested wetlands provide especially valuable habitat for certain forest-dependent songbirds and some of the species most dependent on moist woods are the most susceptible to forest fragmentation.

(b) Wetland Loss: When the project was originally presented to the Norfolk District and the federal agencies in the December 1989 "Preliminary Report on Aquatic Resource Issues" and further documented in the applicant's June 1993 "Alternatives Assessment," the RRWSG reported that 293 acres of wetlands would be impacted by the reservoir at the original dam location (KWR-I). By the time the application was submitted on 6 July 1993, the applicant's environmental consultants had performed a more thorough review and reported that 479 acres would be impacted. However, a detailed wetland delineation of the King William site conducted jointly by environmental consultants working for Newport News Waterworks and James City County in May 1994, revealed that the reservoir would impact approximately 653 acres of wetlands at 90 feet mean sea level. In the first revised permit application submitted on 14 June 1995, the dam was relocated 2,900 feet upstream of the originally proposed dam location and the normal pool elevation was raised by 6 feet. With this configuration, the wetland impacts were reduced to 574 acres (KWR-II) at 96 feet mean sea level. A second revised permit application was

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submitted on 30 December 1996 for a dam at a location 9,700 feet upstream of the originally proposed dam location which reduced the impacts to 403 acres of vegetated wetlands and 34 acres of shallow open water habitat (KWR-IV).

The City of Newport News has included 186 acres of the wetlands and 620 acres of uplands downstream of KWR-IV as a temporary preservation component of their mitigation plan until such time as they enlarge the reservoir footprint back to either the KWR-II or KWR-I location. A clause in the City of Newport News' Development Agreement with King William County reserves the wetlands between the KWR-IV and KWR-II dam sites for future downstream enlargement of the reservoir. If it were ever permitted, such an enlargement would impact a total of 574 to 653 acres of wetlands for the King William Reservoir. These downstream wetlands closely resemble those in the proposed impoundment area and possess a high level of ecosystem diversity.

The King William Reservoir (KWR-IV) would inundate 52 percent of the Cohoke Creek watershed and virtually all of the existing wetlands above the impoundment. The exceptions would be those wetlands on a small number of headwater streams and isolated wetlands above the normal pool elevation. As currently proposed, approximately 403 acres of non-tidal, palustrine forested, emergent and scrub-shrub wetlands and 34 acres of open water plus 21 miles of stream channel would be filled, excavated or inundated by the KWR-IV configuration.

The RRWSG has estimated 21 miles of stream corridor would be impacted by the proposed project. Approximately 12 miles are intermittent streams and 9 miles are perennial. The streams are further described as approximately 11.5 miles of intermittent and 3 miles of perennial first order streams; 0.4 miles of intermittent and 2.6 miles of perennial second order streams; and 3.5 miles of perennial third order streams. This breakdown was based on an analysis of the King William and King and Queen Courthouse U.S. Geological Survey quadrangle maps. A more accurate measurement of the linear footage to be impacted would need to be field determined in order to further develop a stream restoration plan. The area includes all streams that would be below the proposed reservoir's normal pool elevation of 96 feet above mean sea level.

The RRWSG claims that the wetlands impacted in Cohoke Creek are not unique in any way. In a letter dated 27 November 2000 responding to comments on RRWSG's Environmental Issues Summary, the City of Newport News claimed that the existing Cohoke Creek wetlands are not unique because they comprise less than 4 percent of the total estimated non-tidal palustrine wetlands in King William County. As the quality and habitat value of the remaining wetlands and forests in King William County is unknown, no valid comparison with the impacted area can be made. Additionally, non-tidal palustrine wetlands can occur in a wide variety of landscape positions and encompass several hydrogeomorphic wetland classes. Therefore, the City's use of percentages is a mischaracterization of the relative abundance of the Cohoke Creek wetland types in the project vicinity. The District is more concerned with the actual predicted wetland loss associated with the project, rather than with expressions of relative loss of wetland type or acreage that tend to downplay the magnitude of the impacts to the aquatic environment. In their letter of 23 August 1996, the U.S. Fish and Wildlife Service stated that their field representatives found the site to be ecologically diverse and observed a variety of plant communities and hydrologic regimes within the proposed reservoir pool. The Service considers Cohoke Creek to be a unique resource within Virginia's Lower Peninsula. EPA reiterated this opinion in their letter of 28 May 1998 saying, "These wetlands, interspersed among uplands, create a unique ecosystem complex with unique functions and values." Based on the Habitat Evaluation Procedure, as well as the two wetland

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diversity analyses employed by the applicant, I find these areas contain a diverse wetland complex providing multiple ecological functions and high quality wildlife habitat.

This diverse habitat includes beaver ponds, highly productive emergent wetlands, stream bottom and riparian wetlands as well as areas of mature forest. This low-gradient system serves an important role in maintaining water quality. The proposed King William Reservoir (KWR-IV) involves the largest single destruction of wetlands and their associated habitat ever evaluated in the Norfolk District and exceeds the annual wetland impacts authorized by the Norfolk District in the entire State of Virginia for 1996 (394.4 acres), 1997 (267.5 acres) and 1998 (266.4 acres). The next largest impact evaluated in the Norfolk District was James City County's proposed Ware Creek Reservoir, which in 1987 would have impacted 381 acres of wetlands and 44 acres of open water. (By 1994, more detailed mapping and further beaver activity increased the estimated impacts at Ware Creek to about 546 acres of wetlands and 44 acres of open water.)

Comments Received on the RROD Regarding the Value of the Impacted Wetlands: The City of Newport News claims that the wetlands of Cohoke Creek have been portrayed by some to be of high value, unique in a regional setting and in an undisturbed condition. The City commented that there are a very large number of similar systems throughout the mid-Atlantic and Eastern Virginia, many of which are much more diverse and undisturbed. They contend that the RROD stated that the Cohoke Creek wetlands are unique and that I have based my opinion on that determination. The RROD cites letters from EPA and the Service that used the word "unique" in describing the wetland areas of the Cohoke Creek system. The District has determined that the wetlands are unique in that they comprise most of the upper reaches of the Cohoke Creek system, which would be eliminated by the proposed King William Reservoir. Regarding Cohoke Creek's "undisturbed condition," the applicant provided the information that was adopted by the Norfolk District for the FEIS. Page 5-97 of the FEIS stated that the proposed reservoir would result in the loss of unique and pristine wetlands. Early on, the RRWSG realized the diversity and value of the Cohoke system; for example, page 86 of the RROD notes the RRWSG's WET study considered the King William Reservoir to be situated within a "pristine area." More recently the City of Newport News has down-played the importance of Cohoke Creek by insisting that the wetlands are just like all the others in Virginia's Coastal Plain. The presence of other similar wetlands in the area does not make the functions of the Cohoke Creek wetlands any less valuable.

The City of Newport News conducted a desktop review that incorporated National Wetland Inventory mapping, creek bed slopes and beaver activity of Cohoke Creek and surrounding watersheds. The City stated that the results of their analysis show that the wetlands in these surrounding watersheds are very similar in nature to those in Cohoke Creek, and for the most part have comparable mainstem slopes and are heavily influenced by beaver activity. Therefore, the City surmised that the Cohoke Creek wetlands assemblage is not unique, but in fact is one of the most common types found locally as well as regionally. Even if there are other wetlands in the region that are similar in nature, their existence in no way diminishes the value of the complex and diverse wetlands of the Cohoke Creek wetlands.

The City of Newport News claims that there are many conditions of the Cohoke Creek wetlands that suggest that wetland functions may be diminished in some capacity through disturbances in the basin. The City stated that the functions of the Cohoke Creek wetlands would likely only be equal to or less than the functions of the wetlands in the surrounding basins within the County. The City commented that for hundreds of years, the Cohoke Millpond dam has cut off the downstream export of nutrients and sediments. Therefore, the City claims that the nutrient export function of the Cohoke Creek wetlands is

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diminished and the importance of the sediment retention function is reduced, since much of the system's sediment is trapped in the Millpond. The District recognizes that the existing Cohoke Millpond dam limits the sediment transport and nutrient export linkage between the upstream portions of Cohoke Creek and its lower freshwater tidal reaches. However, as noted in several places in the RROD, the existing Cohoke Millpond dam does nothing to diminish either of these functions between the Cohoke Creek wetlands in the proposed King William Reservoir pool area and the downstream reaches of Cohoke Creek that are situated upstream of the Cohoke Millpond dam. This is why the District continues to maintain that the proposed project would not only result in impacts to the diverse aquatic habitats located within the footprint of the King William Reservoir, but would also detrimentally impact the downstream non-tidal portions of Cohoke Creek. Ironically, the City cited the detrimental effects that the Cohoke Millpond Dam has had on Cohoke Creek, yet they continue to claim that the proposed King William Reservoir, an impoundment that would be several orders of magnitude larger than Cohoke Millpond, would completely avoid these same impacts.

The applicant stated that the functions of the Cohoke wetlands have also been disturbed by beaver activity and ongoing logging operations. The beaver activity in the Cohoke system is natural, changes over time, and adds to the constantly evolving nature of the wetlands present. The logging operations have also been ongoing for many years. While logging does cause disruptions, it has not caused the wetlands to be less valuable. In fact, the wetlands are even more necessary for providing water quality benefits to downstream areas. In their comments on the RROD, the federal advisory agencies reiterated their belief that the Cohoke Creek wetlands are of high quality. The Service commented that the Cohoke Creek wetlands represent a "complex mosaic of stream valley wetlands" and EPA stated that the Cohoke Creek "wetlands, interspersed among each other and among some very significant upland habitat, are of high quality and are structurally complex thereby providing multiple ecological functions to the watershed."

(i.) Impacts to Downstream Wetlands: The RRWSG claims there are 186 acres of non-tidal wetlands in the mainstem (associated headwater wetlands not included) of Cohoke Creek between the proposed KWR-IV dam site and the upper reaches of Cohoke Millpond. Concern for maintaining the existing hydrologic regime (and associated sediment/nutrient dynamics, etc.) for downstream wetlands has been raised by the District and the advisory agencies. These wetlands are supported in part by hydrologic input from above the proposed dam location and could change in character and/or be reduced in acreage by the almost two-thirds reduction in flow volume. In a letter dated 22 July 1999, the Service indicated their continued concern that the RRWSG's plan for downstream releases would not avoid impacts to the functioning of downstream wetlands. The RRWSG stated that their proposed reservoir releases would attempt to mimic the natural downstream flows in Cohoke Creek. Regardless of the release schedule implemented for the King William Reservoir, the mere fact that a dam would be placed across Cohoke Creek assures that the existing flow regime and associated processes (e.g., downstream sediment transport, channel-forming and channel-maintaining flooding events, timing and magnitude of flood flows, etc.) would be altered. The RRWSG's Mitigation Program, Fish and Wildlife Plan claims "the project will result in the added retention of approximately 590 tons of sediment per year." There is little doubt that the existing Cohoke Creek vegetated wetlands do perform a sediment retention function, but in such a sparsely developed watershed it is at an appropriate level that still allows sediment pulses to be regularly transferred to downstream wetlands. This downstream transport of sediment is not only normal, but is essential for the natural maintenance of a healthy riverine system according to Leopold, et al, in a 1964 publication, Fluvial Processes in Geomorphology; and in a 1995 paper entitled "Downstream Ecological Effects of Dams" by Ligon, *et al.*, as well as in Restoration of Aquatic Ecosystems by the National Research Council, (1992). The proposed dam would disrupt the existing balance between

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erosional and depositional rates for portions of Cohoke Creek proper located downstream of the project area and extending down-gradient at least to Cohoke Millpond. By depriving sediment inputs to downstream portions of Cohoke Creek, the proposed dam would detrimentally alter the processes responsible for maintaining the dimensions and dynamics of the existing Cohoke Creek channel and associated floodplain. Ligon *et al.* state “if a stream’s physical foundation is pulled out from under the biota, even the most insightful biological research program will fail to preserve ecosystem integrity.”

This is a perfect example of where an alteration (in this case construction of the King William Reservoir) that maximizes one or a few wetland functions can actually be detrimental to the overall environment.

The proposed KWR-IV would result in the impoundment of a large portion of the upper Cohoke Creek watershed, including headwater drainages, associated vegetated wetlands, and adjoining upland habitat. Eliminating these features would sever organic inputs and processing of detritus for much of the Cohoke system, especially for those wetlands associated with the mainstem of Cohoke Creek located downstream of KWR-IV and upstream of the Cohoke Millpond. Significant losses of small forested wetlands along low order streams, with their associated capacity to retain or transform water, sediment, and nutrient inputs, could influence both the quantity and quality of inputs to higher order streams, their associated floodplains, and ultimately downstream estuarine and marine ecosystems, as discussed in the papers entitled “Changes in the Functioning of Wetlands Along Environmental Gradients” by Brinson in 1993 and “Functions and Values of Forested Wetlands in the Southeastern United States” by Walbridge in 1993.

Although the continuity of headwater vegetated wetlands to freshwater tidal vegetated wetlands of Cohoke Creek is currently severed by the Cohoke Millpond, dissolved and particulate forms of organics and other nutrients originating in the Cohoke headwaters eventually contribute to the maintenance of downstream aquatic communities, especially during flood events. The degree to which the proposed King William Reservoir might impact the lower reaches of Cohoke Creek has not been determined.

The RRWSG has offered to place temporary conservation easements over 186 acres of stream corridor (this acreage does not include associated headwater wetlands) and 620 acres of adjoining upland habitat located downstream of the proposed King William Reservoir dam and upstream of the existing Cohoke Millpond dam. However, since the RRWSG has not agreed to preserve these areas in perpetuity, it raises the question of possible future impacts to this reach from related King William Reservoir activities. As noted earlier, a clause in the City of Newport News’ Development Agreement with King William County reserves the wetlands between the KWR-IV and KWR-II dam sites for future downstream enlargement of the reservoir.

Considering the above, the King William Reservoir would impact additional wetlands other than those currently situated within the proposed reservoir pool area. This is contrary to the RRWSG’s claim in the Final Wetland Mitigation Plan that “the inescapable conclusion...is that there is no realistic possibility for cumulative environmental degradation.” The RRWSG continues to assert the environmental impacts of the project would be limited to the KWR-IV pool area. While the downstream impacts would be more subtle and more difficult to calculate than those inside the reservoir, I am convinced they would occur.

The City of Newport News stated that the District erroneously concluded that organics and other nutrients from Cohoke Creek directly contribute to the maintenance of Cohoke Swamp; and yet Cohoke Swamp is not even in the Cohoke Creek watershed. They stated Cohoke Swamp is located 1-mile downstream of Cohoke Creek and is “maintained by the organics and nutrients provided in tidal flows of the Pamunkey

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River.” In the RROD (page 67) the District states “Although the continuity of headwater vegetated wetlands to freshwater tidal vegetated wetlands of Cohoke Creek is currently severed by the Cohoke Millpond, dissolved and particulate forms of organics and other nutrients originating in the Cohoke headwaters eventually contribute to the maintenance of downstream aquatic communities, especially during flood events.” This is an accurate statement. The sentence immediately following this in the RROD cites Fowler and Hershner’s (1989) study on the primary productivity of Cohoke Swamp. The District does infer that Cohoke Swamp is synonymous with the area immediately downstream of Cohoke Millpond dam. The District made this assumption because of the name and the vague project area description provided in Fowler and Hershner (1989). Dr. Hershner has since communicated to the District that Cohoke Swamp corresponds to the area noted as “Cohoke Marsh” on the New Kent USGS quadrangle, which is not located immediately downstream of Cohoke Millpond dam, but is situated a short distance downstream. The District recognizes this error and this use of the Fowler and Hershner (1989) reference has been deleted from the Final RROD. The vegetated freshwater-tidal wetlands located immediately downstream of Cohoke Millpond dam periodically receive organics and nutrients from the Cohoke Creek wetlands. Additionally, these freshwater-tidal wetlands are regularly “maintained by the organics and nutrients provided in tidal flows of the Pamunkey River,” as is the neighboring Cohoke Marsh wetland system that was studied by Fowler and Hershner (1989).

(ii.) Wetland Conversion Impacts: Installing the pipeline from the proposed King William Reservoir to the Diascund Reservoir would also impact wetlands. Approximately 10.4 acres of wetlands would be converted from forested wetlands to emergent and/or scrub-shrub wetlands. Although the affected area would still be vegetated wetlands if pre-disturbance contours are re-established, there would be a loss of forested wetland function associated with a change in cover type due to clearing and continued maintenance of the utility corridor. Evaluating these wetland conversion impacts as permanent wetland impacts is consistent with the Corps’ current Nationwide Permit policy (NWP-12) for utility line projects with wetland cover type conversions in easements that will be continually maintained (Chief, Regulatory Branch, HQ-USACE, Draft “Nationwide Permit Questions and Answers,” February 1997; Final Notice of Issuance and Modification of Nationwide Permits published in the Federal Register (Volume 65, Number 47 on 9 March 2000). Common reed (*Phragmites australis*) and other exotic species that thrive in disturbed areas may also re-vegetate the pipeline right-of-way and further reduce its habitat value. Also, approximately 0.15 acres of wetlands would be filled and excavated by the proposed outfall structure, riprap apron and discharge channel on Beaverdam Creek.

EPA commented that the impacts related to the loss of 437 acres of diverse and valuable wetlands/open water habitat within the Cohoke Creek basin would be significant. The wetlands of the Cohoke Creek site have been shown to be of high structural complexity and ecological value. Available literature on restoration of palustrine forested and scrub-shrub wetlands indicates that these types are among the most difficult to mitigate. If these impacts are not appropriately mitigated, EPA feels that the project may result in substantial and unacceptable impacts to Aquatic Resources of National Importance (ARNI). The U.S. Fish and Wildlife Service recommended denial of the proposed King William Reservoir because the project’s impacts would be extremely detrimental to the fish and wildlife resources of Southeast Virginia and will result in substantial and unacceptable impacts to Aquatic Resources of National Importance.

The RRWSG stated their belief that these wetlands are not a good example of forested riparian systems in the Coastal Plain because of disturbance from silviculture and agriculture as well as from the Cohoke Millpond and beaver activity. They also disagree with the determinations by EPA and the Service that the wetlands in Cohoke Creek constitute an Aquatic Resource of National Importance (ARNI). EPA

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reiterated their position that the Cohoke Creek wetlands constituted an ARNI in the letter responding to the applicant's Environmental Issues Summary. In the 27 November 2000, letter responding to the comments from the EPA on the RRWSG's Environmental Issues Summary, Newport News stated, "The Cohoke Wetlands do not constitute a National Resource of Aquatic Importance." Newport News appears to have meant the term Aquatic Resource of National Importance. The designation of an ARNI is procedural, as it applies to EPA's ability to elevate a project under the "Section 404 (q) Memorandum of Agreement between the Environmental Protection Agency and The Department of the Army." The Department of Interior has a similar MOA with the Department of Army concerning the Service's ability to elevate a decision when they determine that the project may result in substantial and unacceptable impacts to Aquatic Resources of National Importance. If a signatory agency to this MOA asserts that a resource is an ARNI, it is up to the Assistant Secretary of the Army for Civil Works to agree or disagree with that assertion. Neither the Corps nor the applicant can make a determination of the presence or absence of an ARNI.

In his letter of 2 May 2001, DEQ Director Dennis Treacy questioned how the Cohoke Creek wetlands could be an ARNI and stated that it appears to him that an ARNI is any water body so designated by EPA. He admitted, however, that DEQ is "... unaware of the criteria by which an Aquatic Resource is judged [to] be of National Importance." Mr. Treacy contends that there is nothing particularly unique about Cohoke Creek to King William County, so he does not comprehend how the wetlands could be of National Importance. A discussion of the designation of an ARNI appears in the above paragraph. It is true that for the purposes of the Section 404 (q) MOA, an ARNI is what the Service or EPA say it is, unless the Assistant Secretary of the Army for Civil Works finds differently. The RROD amply documents the ecological importance of the integrated Cohoke Creek wetlands and aquatic systems; and supports EPA's and the Service's assertion. In their comments on the RROD, the Service and EPA indicated that they continue to believe that the wetlands of Cohoke Mill Creek would qualify as Aquatic Resources of National Importance.

(c) Upland Loss: The Corps of Engineers does not have jurisdiction over the 1,089 acres of uplands that would be lost; therefore, mitigation for upland impacts is not required as a part of the public interest review. However, the uplands are an integral part of the wetland/upland ecosystem in the Cohoke Valley and would be both directly and indirectly affected by the proposed reservoir. Therefore, the impacts to upland areas were described in the EIS and their habitat value was evaluated along with the wetlands in the HEP analysis. The function of these uplands is enhanced by their juxtaposition and interspersation with the wetlands of Cohoke Creek. In addition to wildlife habitat, these uplands provide nutrient cycling, erosion control and groundwater recharge. The City of Newport News contends that the upland areas that will be affected "...do not represent a very high quality habitat...." and "...are not worthy of special consideration..." To illustrate their point they provided photographs of an area that was recently clear-cut. The Virginia Department of Conservation and Recreation Division of Natural Heritage commented that the existing silvicultural activities have not resulted in poor quality habitat as alleged by the applicant. Approximately 214 acres of the upland habitat has been impacted by logging activity. In the silvicultural management of the area, sections are cut and allowed to re-grow on a rotational basis. The new growth in recently cut areas provide early successional habitat that also has wildlife value. Furthermore, the mature forest patches still present within the Cohoke Valley provide core habitat suitable for nesting neotropical migrants. The early successional openings and pine forests in addition to the narrow corridors of late successional forests allow dispersal between the mature forest patches. Furthermore, the clear-cut areas are not as extensive as implied by the City of Newport News.

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Comments Received on the RROD Regarding Fish and Wildlife Resources: The City of Newport News stated that silviculture has resulted in significant water quality impacts by providing pulses of sediment loads to the Cohoke Creek system. They claim that heavy sediment loading to Cohoke Creek from logging operations was evident from deposits behind the old dam site and behind the numerous beaver dams on the Creek. On page 85, the RROD noted that although logging operations often do fragment large forested blocks, in comparison to the RRWSG's proposal to backflood a large portion of the Cohoke Creek upper watershed, the influence of logging can be viewed as a relatively temporary impact. Silvicultural activities can and do alter sediment deposition rates, wildlife habitat, TNPP rates, and nutrient cycling; however, they rarely sever such connections as would construction of the King William Reservoir dam. The existing forests in the sparsely developed Cohoke Creek watershed are successional forests that have been cut and re-grown in alternating cycles for many decades. The existing wetlands of Cohoke Creek have developed under and are a product of these cycles. The concentration of "heavy sediment loads" behind the old dam site and beaver dams as noted by the City of Newport News highlights the fact that Cohoke Creek transports sediments downstream in balance with these cycles. The proposed King William Reservoir dam would completely disrupt this balance by retaining all the sediment from those portions of Cohoke Creek situated upslope of the dam.

The City of Newport News contends that continued forest fragmentation from current timbering practices in the project area has resulted in the decline of many species. The City claims that most of the uplands in the project area are currently managed for timber harvest, resulting in a reduction of community diversity and a decline in wetland/upland interaction. The District agrees that logging temporarily changes the community diversity and species composition in the project area, but the applicant has failed to provide any information supporting their claim that this results in a decline in these two metrics. Since the extent of wetlands and uplands does not generally change with logging, there is little chance that there would be a decline in the interaction between these habitat types. The District recognizes that logging in the project area is not new, and that the mature upland and wetland forests that formerly covered the project area before this most recent logging rotation had regenerated from a previous logging event. That is why alterations resulting from silvicultural activities are appropriately considered temporary in this context when compared to the proposed King William Reservoir. The same environmental impacts listed above by the City (e.g., fragmentation, reduction in community diversity, decline in wetland/upland interaction) would result from the proposed King William Reservoir project; however, unlike silvicultural activities these impacts would be permanent.

The City of Newport News claims the uplands and wetlands within the project area do not provide "high quality wildlife habitat" (RROD, page 66), and they claim that the HEP analysis supports their conclusion. The City also commented that the HEP results indicate the habitat within Cohoke Creek is far from optimal for supporting many of the targeted wildlife species. The District continues to defer to the Service's comments in the RROD (pages 72 and 73) regarding the applicant's misinterpretation of the HEP findings.

The City of Newport News disagrees with the Service's statement that the proposed King William Reservoir would be detrimental to fish and wildlife resources of Southeast Virginia. The City stated that the Service failed to acknowledge that the HEP and other studies demonstrated the project area and fish and wildlife resources are not unique to King William County or Southeastern Virginia. The City further claims that the Service failed to recognize that the "majority" of impacts to fish and wildlife habitat would be offset by the reservoir, buffer, and mitigation sites. The District fails to see why the City claims that the fish and wildlife resources would have to be unique in order for there to be a detrimental impact, and

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continues to defer to the Service's comments in the RROD (pages 72 and 73) regarding the applicant's misinterpretation of the HEP findings. The District also notes that the applicant's mitigation plan fails to provide full, in-kind habitat compensation.

The City of Newport News claims that the habitat suitability for species requiring large contiguous areas of mature forest, wetland scrub-shrub habitat, permanently and semi-permanently flooded wetland habitat, upland evergreen forest, or upland shrub habitat was less than average within the project area. The District continues to defer to the Service's comments in the RROD (pages 72 and 73) regarding the applicant's misinterpretation of the HEP findings.

The City of Newport News noted that the RROD (page 87) stated "the accelerated logging in the project area was likely due, in part, to the King William Reservoir proposal." The City felt that the District should also note that increased logging activity might also be attributable to the recent sale of the near-by West Point paper mill, advances in logging technologies, and high economic value of the watershed as a source of lumber and pulp due to high lumber prices and proximity of the paper mill. The District specifically stated "in part," recognizing that there were likely to be other causes. I agree that there may be other reasons why accelerated logging may have occurred in the watershed. The reasons listed by the City seem plausible.

The City of Newport News claims that the District underestimated the extent of logging in the project area. They also believe that the District's assertion that "clear-cut areas are not as extensive as implied by the City of Newport News" (p.69 of the RROD) contradicts the District's statement that the reservoir proposal resulted in "accelerated logging in the project area" (p. 87 of the RROD). These two statements are quoted out of context from two separate sections of the RROD. The statement that there may be accelerated logging in the area does not indicate the extent of clear cutting. The exact extent of logging at any particular time is unknown, however, I believe that Newport News' portrayal that the majority of the site has been clear-cut may not depict actual site conditions.

The City of Newport News stated that they agree that early successional habitat provides wildlife habitat and that the RRWSG has offered mitigation strategies to offset the loss of this habitat type. As noted on page 74 of the RROD, one of the mitigation strategies offered by the RRWSG to offset losses of early successional habitat would be the maintenance of new cleared easements that would be associated with new pipelines proposed for the King William Reservoir. I did not concur with this mitigation strategy since the RRWSG had not documented the habitat conversion and fragmentation impacts that would likely result from construction of these new easements, nor did they demonstrate that these habitat conversions would be beneficial.

Newport News disagrees with the RROD's indication that the project area contained core habitat suitable for nesting, neotropical migrants because the HEP report concluded that only 87 acres of mature forest were present in the project area, and many species of neotropical migrants need large areas of undisturbed forest. Approximately 1,089 acres of upland in various stages of succession are present in the project area providing habitat for many different species, some of which do not necessarily require mature forest, but use contiguous forested areas with temporarily cleared patches. In addition, neotropical migrants are particularly affiliated with riparian corridors such as those found along Cohoke Creek and its tributaries. Furthermore, in a 3 May 2001 letter commenting on the RROD, the Virginia Audubon Society indicated that they have observed the following neotropical migrant species which they assume to be nesting at Cohoke Creek: black-and-white warbler, parula warbler, hooded warbler, American redstart, blue-gray

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gnatcatcher, great-crested flycatcher, red-eyed vireo and summer tanager. In addition they believe that “Cohoke Creek is almost certainly an important stopover for many more species of migratory songbirds continuing to breeding grounds to the north and west.”

The City of Newport News claims that the fish and wildlife resources within the reservoir pool area are not unique, and that detailed surveys and reviews of the Ware Creek, Black Creek and King William Reservoir alternatives determined that the three systems possess very similar fish and wildlife habitat. The District has not claimed that the fish and wildlife resources within the project area are unique, rather that these resources are diverse. A representative example was noted on page 86 of the RROD where the RRWSG’s reptile and amphibian study by Mitchell in 1994 states “The lack of rare species in the Cohoke Mill Creek watershed does not mean that the area is unimportant herpetologically. On the contrary, this system of wetlands harbors a rich diversity of amphibians and reptiles. The relatively pristine nature of the wetlands in and associated with the creek insures that numerous species requiring water for some part of their life cycle will occur there. The list of species...demonstrates that the fauna is healthy.”

The City of Newport News commented that the reintroduction of beaver to Virginia in the early part of the Twentieth Century has perhaps been one of the most notable effects on the Cohoke Creek wetlands. The City stated that as beavers have no natural enemies, a proliferation of pond building has gone unchecked, effectively converting forested wetlands to open water and emergent wetlands. These comments imply that existing beaver activity in the project area is a disturbance that has resulted in the conversion of vegetated wetlands to open water habitat, not unlike the habitat that would result from the proposed project. However, unlike the proposed King William Reservoir, beaver dams are natural, dynamic features that individually influence smaller, localized reaches and have shaped the existing mosaic of vegetated wetlands present in the Cohoke Creek watershed. The District recognizes that beavers are native to Virginia and that they perform many important functions for the aquatic environment. The natural wetland conversions resulting from beaver activity often increase the habitat diversity at the landscape level, which is dynamic over time as beaver dams are breached and rebuilt. As noted previously by the City, the numerous beaver dams can accumulate “heavy sediment loads” and enhance the sediment retention function of wetlands. Naiman *et al.* (1988) attributes the following functions to beaver activities: retention of sediment and organic matter in the channel, creation and maintenance of wetlands, modification of nutrient cycling and decomposition dynamics, modification of the structure of the riparian zone, influence over the character of water and materials transported downstream, and influence on plant and animal community composition and diversity.

Governor Gilmore commented that the new proposed reservoir would offer wildlife benefits such as habitat for migrating and resident Canada geese. Additionally the Governor stated that maintenance of the new pipeline rights-of-way and the reservoir buffer would benefit “edge” species such as white-tailed deer. The District does not dispute that the proposed King William Reservoir would result in habitat for a relatively few generalist species for which suitable habitat is not a limiting factor in Virginia.

(d) Functional Assessments: The 1990 Memorandum of Agreement (MOA) between the Corps and EPA regarding “The Determination of Mitigation Under the Clean Water Act Section 404(b)(1) Guidelines” states the “objective of mitigation for unavoidable impacts is to offset environmental losses...such mitigation should provide, at a minimum, one for one functional replacement (i.e., no net loss of values), with an adequate margin of safety to reflect the expected degree of success associated with the mitigation plan.” The MOA also states “this ratio may be greater where the functional values of the area being impacted are demonstrably high and the replacement wetlands are of lower functional

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value or the likelihood of success of the mitigation project is low.” For more routine smaller-scale projects, acreage is commonly used as a surrogate for wetland functional replacement; therefore, early on in the review process the District set a 2 to 1 wetland creation/restoration compensation ratio as a wetland compensation goal. Due to the magnitude of wetland impacts associated with the proposed King William Reservoir, the District and federal and state advisory agencies emphasized that other methods would be needed to identify and evaluate wetland functional replacement needs (e.g., HEP for wildlife functions).

(i.) Habitat Evaluation Procedures: At an interagency King William Reservoir Wetland Mitigation Workshop held on 02 August 1995 in Fredericksburg, Virginia, it was agreed that a Habitat Evaluation Procedures (HEP) study would be conducted for the project. The HEP analysis was needed to quantify anticipated impacts to the range of habitats existing on the proposed reservoir project site and to determine what would constitute in-kind compensation for habitat impacts. It was also used to determine whether the proposed compensatory mitigation for the reservoir would offset anticipated habitat impacts as well as to identify general types of compensation required to offset habitat impacts.

An interagency team composed of representatives of the Norfolk District Corps of Engineers, the Environmental Protection Agency, U.S. Fish and Wildlife Service, Virginia Department of Environmental Quality - Water Division, Newport News Waterworks, and Malcolm Pirnie, Inc. was formed in November 1995 to conduct the analysis. In the fall of 1996, the team invited an authority on the application of HEP and habitat models, Dr. Dean Stauffer of Virginia Polytechnic Institute, to attend team meetings, review the analysis, and provide technical advice to ensure that the analysis was scientifically sound and consistent with the principles of HEP. Team decisions on cover type classification, species selection, field sampling protocols, data analysis, and assumptions about habitat succession were made by consensus. As no agency or team member had veto authority over the team’s decisions or actions, and reaching consensus was difficult and time consuming, discussions on contentious issues were tabled until the team had completed literature research, field investigations or consulted with local authorities. Only two issues were determined by the Norfolk District rather than by consensus: the life of the project for the HEP analysis was determined by the District to be the 50-year life of the project as identified in the EIS; and the Norfolk District Regulatory Branch practice has consistently been that HEP analyses must show what is required for full in-kind habitat compensation.

Unlike the other functional assessment methods applied to the King William Reservoir project, the HEP study subdivided the King William Reservoir assessment area based on cover type and hydrologic regime. A total of 64 cover types and hydrologic regimes in 9 major categories consisting of both wetland and upland habitats were identified prior to actual habitat analysis: Cove Hardwood, Upland Mixed Forest, Upland Evergreen Forest, Early Successional Logged Area, Palustrine Open Water, Palustrine Emergent, Palustrine Scrub-Shrub, drier Palustrine Forest (Saturated and Temporarily Flooded), and wetter Palustrine Forest (Seasonally Flooded/Saturated and Semi-permanently Flooded). Additionally, HEP can often take landscape position and hydrodynamics into account via species model variables, and limiting the use of species models to specific cover types and geographical areas.

It is also important to keep in mind that HEP does not evaluate all habitat types associated with a given project. The Habitat Evaluation Procedures Workbook (Stiehl, 1995) states “given that you can only study a small portion of the entire wildlife system of concern, it is essential to give adequate time to deciding what parts of the system will be studied and why... regional wildlife resource objectives should be used as the overriding factor guiding the species selection process.” The interagency HEP Report lists the Service’s regional wildlife resource objectives as protection of habitat for forest interior dwelling birds,

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species sensitive to forest fragmentation, species that use wetlands and riparian zones, threatened and endangered species, and passage for anadromous fish. In a memo dated 7 November 1995, other regional wildlife resource objectives proposed by the RRWSG for the King William Reservoir included: species that use mature hardwood forests, species of public importance, cavity nester species, and species that are habitat specialists. Twelve evaluation species were chosen to represent several of these regional wildlife resource objectives and some of the more important habitat types present in the King William Reservoir project area. Selected species were representative of the range of fish and wildlife species occurring in a given cover type. Wetland species selected were: beaver (*Castor canadensis*), mink (*Mustela vison*), great blue heron (*Ardea herodias*), wood duck (*Aix sponsa*), and redbreast sunfish (*Lepomis microlophus*). Upland species selected were: brown thrasher (*Toxostoma rufum*), field sparrow (*Spizella pusilla*), and pine warbler (*Dendroica pinus*). Species representing wetland and/or upland were: pileated woodpecker (*Dryocopus pileatus*), yellowthroat (*Geothlypis trichas*) the terrestrial stage of the red-spotted newt (*Notophthalmus viridescens viridescens*) and gray squirrel (*Sciurus carolinensis*). The analysis of habitat impacts associated with the project was broken down into 3 distinct phases: an analysis of gross habitat losses resulting from reservoir construction; an analysis of habitat change resulting from construction of the reservoir; and an evaluation of the compensation needed to offset projected habitat losses associated with the project.

Gross habitat losses were determined to be the loss of all potential habitats within the reservoir pool area over the life of the project and constitute a worst-case scenario for habitat impacts. After an analysis of the gross habitat losses, it was necessary to quantify projected habitat changes from the construction of the reservoir, including any habitat gains that might be realized from the creation of shallow water habitat and the extensive reservoir shoreline. While team members agreed that some vegetated wetland fringe would develop along portions of the new reservoir lakeshore, a consensus was not reached on the amount or extent of fringe wetland development or the time frame for habitat development. Thus, wetland fringe acreage was not quantified or considered in this evaluation. In their Mitigation Program, Fish and Wildlife Mitigation Plan and the Environmental Issues Summary, the RRWSG claims that the King William Reservoir would provide an important lacustrine and deepwater habitat, which was not fully evaluated by the HEP study. The interagency HEP study did evaluate and credit the riparian zone and shallower margins of the reservoir. The riparian zone was defined as a 30-meter wide band extending upslope of the proposed reservoir lakeshore. As defined in the HEP beaver and mink models, this zone could include upland and/or fringe wetlands. The deeper portions of the reservoir were not emphasized in the HEP study, because as noted in a 1994 publication by Tiner *et al.* entitled "Recent Wetland Status and Trends in the Chesapeake Watershed (1982 to 1989)," this type of habitat is not limiting factor in the Virginia Coastal Plain. Reservoirs/lakes/ponds were not identified as an important regional wildlife resource objective for this part of Virginia.

Lastly, the interagency HEP team was charged with identifying compensatory mitigation measures needed to provide full, in-kind replacement of habitat losses for all evaluation species. Of the three study goals, the use of the HEP results in design of the wetland compensation package was somewhat limited, because the HEP study was conducted concurrently with development of the wetland mitigation plan. The HEP study results were not finalized until early 1999; by which time at least three drafts of the wetland compensation plan had already been submitted by the RRWSG and reviewed by the agencies. Additionally, at least half of the currently proposed wetland compensation sites had already been identified by the project proponents in the August 1996 Conceptual Mitigation Plan submitted to the Virginia Department of Environmental Quality, well before the analysis of the HEP data and before the formation of the interagency wetland mitigation team. Although there was quite a bit of overlap in

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members of the HEP and wetland mitigation teams, much of the time spent by the interagency wetland mitigation team in reviewing potential wetland compensation sites concentrated on evaluating sites for “fatal flaws” to debit against the 2 to 1 compensation ratio acreage goal, rather than tallying the sites’ cumulative potential for full in-kind compensation of wetland habitat or other wetland functions.

In a memo dated 25 November 1997, the Service supported the parallel tracking of the HEP and mitigation teams because all parties already had an understanding that there was a 2 to 1 wetland creation/restoration baseline goal from which the HEP results would help build and shape an appropriate compensation plan. They felt it was more expedient to have the wetland mitigation team review the feasibility of specific sites, and then later use this real world data to plug into the HEP evaluation of expected habitat gains from proposed compensation sites. The HEP analysis was applied to a sample of the applicant’s proposed wetland compensation sites, each of which included restoration/creation of wetlands and preservation of the proposed reservoir buffer area. The team developed models of habitat succession to predict what these sites would look like over a 50-year period in order to evaluate the extent to which these wetland restoration/creation sites would offset habitat impacts and to project the total habitat benefits likely from the planned wetland mitigation. This was the strategy previously agreed to by the HEP and wetland mitigation teams, and was continued to the conclusion of the HEP study in 1999. In a comment letter dated 22 December 1998, the Service reiterated their belief that “one of the major beneficial features of the King William Reservoir HEP study is the method of using our 6 identified potential mitigation sites as realistic compensation landscapes,” and that they “believe this report will be an important template for other HEP studies conducted in the Mid-Atlantic states.”

Because the proposed reservoir buffer was not a required part of the project, its size could vary considerably. The HEP team agreed to consider this buffer as a mitigative action and part of a compensation plan for the project, but not as part of the project itself. In May 1998, the applicant adopted plans for a buffer equal to or exceeding 200 feet in width within which no development would occur other than establishment of hiking trails and other passive recreation facilities. In order for the proposed 1,990-acre reservoir buffer to be considered as mitigation for habitat impacts, it had to meet all of the life requisites for a given evaluation species. Also, the habitat gains associated with its preservation over the life of the project had to be evaluated. This entailed projecting future growth and development of upland forest cover in this buffer over the next 50 years. As suitable habitat for the pileated woodpecker consists of large blocks of contiguous mature forest, the team believed that this requirement could not be met within a 200-foot wide band of forest. The team determined that the proposed reservoir buffer would not provide suitable habitat for the pileated woodpecker, but it could offset much of the habitat losses for the gray squirrel and red-spotted newt. (A detailed description of the HEP study is provided in the District’s report entitled “Summary of HEP analysis for the King William Reservoir.”)

The Norfolk District and Service feel that the final HEP Report accurately describes the interagency HEP study performed for the King William Reservoir, and both support the documentation and findings of that document. However, both agencies strongly feel the description of the HEP findings in the Environmental Issues Summary are completely inaccurate and misleading. The RRWSG forwards the opinion that the HEP study indicates the existing Cohoke Creek wetlands provide only moderately suitable habitat for the selected wetland species because the “habitat value average for all species was only 0.51 out of a possible score of 1.0.” They further state habitat values were expected to be high using HEP “since species are only selected which are well suited to this type of habitat.”

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The Service made the following comments regarding the RRWSG's misinterpretation of the HEP findings in the Environmental Issues Summary:

"The Service believes the RRWSG's presumption, "The results of the HEP gross loss analysis (Malcolm Pirnie, 1999) indicate that the existing wetlands within the pool area provide only moderately suitable habitat for the selected wetland species," is incorrect and invalidly drawn. The Service is surprised to respond to these misapplications of the Habitat Evaluation Procedures Study, as the consultants for the RRWSG are amply trained to provide the guidance the RRWSG needs in interpreting HEP results. Training in HEP was provided in May 1996 for the RRWSG's consultants Malcolm Pirnie, the Norfolk District, and the Service's Chesapeake Bay Field Office employees in one joint training class. According to the HEP Workbook (revised 7/95) distributed to the class, 'HEP may be adapted to many different uses, including project planning, impact assessment, mitigation and compensation, and habitat management by providing information for two types of wildlife comparisons: (1) the relative value of different areas at the same point in time, and (2) the relative value of the same area at future points in time.' HEP makes quite clear that the values are not absolute values, but only have meaning in the relative sense, when comparing habitats. For example, a habitat suitability index value of 0.55 generally indicates better suitability for a given species, than a score of 0.35. But in no way does HEP say that 0.55 equals mediocre habitat and 0.35 equals bad habitat, as the "Environmental Issues Summary" attempts to portray....

There is no logical foundation in taking the habitat suitability index values across every single habitat type of varying acreages for all species, and compiling these numbers into an "average." There is absolutely no meaning in the 0.51 number, and it is a gross misapplication of HEP to make statements based upon such a numerical exercise. Less than ideal habitats were purposely sampled for most species, because the HEP Team felt that if the habitat had significant potential use by an evaluation species, that habitat should be included. For example, suitability for pileated woodpeckers was assessed in upland evergreen forests (UEF) because these habitats can be used when tree diameters are large. The habitat suitability index value was 0.21 in evergreen forest plots, compared to a value of 0.43 in upland mixed forest plots. The HEP Team was attempting to characterize all useable habitats for a species across the project site in a representative manner, and not skew the results only towards prime habitats. Likewise, mitigation sites were evaluated and credited for these less than ideal habitats for an evaluation species. In addition, a value of 0.43 for pileated woodpecker has no equivalence to a value of 0.43 for red spotted newt, because the species models are constructed much differently, and their component variables are scaled differently."

The Norfolk District acknowledges that the Service is the recognized federal expert regarding the application and interpretation of HEP studies and I have no reason to disagree with their determination that the applicant misinterpreted the HEP results.

In accordance with current Norfolk District practice, all HEP studies completed for proposed projects in the District boundaries must demonstrate what types of compensation strategies would be required for full, in-kind fish and wildlife habitat replacement. The HEP Report outlines a series of alternative mitigation strategies that would provide full, in-kind habitat compensation for all the evaluation species.

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Out of numerous potential compensation scenarios, the HEP Report provided four compensation strategies that would provide full, in-kind habitat compensation. One of those identified strategies would provide full, in-kind habitat compensation with the least acreage of land and still meet the 2 to 1 compensation ratio for wetland impacts due to reservoir construction. That strategy consists of the reservoir, a 1990-acre reservoir buffer, another 228 acres (in 3 parcels) contiguous with the buffer, 806 acres of wetland restoration/creation, 406 acres of forested wetland preservation, 586 acres of managed evergreen forest (i.e. pine plantation), 145 acres of managed oldfield (managed pasture), and 208 acres of reconnected backwaters. It should be emphasized that this strategy is only one possible theoretical compensation plan that would provide full, in-kind wildlife habitat replacement. The compensation plan currently proposed by the RRWSG differs from all scenarios outlined in the HEP Report and is discussed below.

Table 10-3 in the Mitigation Program, Fish and Wildlife Mitigation Plan outlines the RRWSG's currently proposed compensation plan as it relates to HEP. The plan proposes 275 acres of lacustrine habitat from the reservoir proper, 1990 acres of buffer surrounding the reservoir, 806 acres of wetland creation/restoration, 769 acres of upland restoration, 211 acres of forested upland preservation, 436 acres of forested wetland preservation, 20 acres of stream restoration, preservation of areas downstream of KWR-IV (186 acres of wetland preservation and 620 acres of upland preservation), and 73 acres of King William Reservoir pipeline management.

The preservation of areas downstream of KWR-IV and management of the King William Reservoir pipeline easement were not reviewed as compensation strategies by the interagency HEP or mitigation teams and are not suitable compensation measures. Areas downstream of KWR-IV are unacceptable for mitigation because they would likely be impacted by the current project, the RRWSG has not agreed to preserve these areas in perpetuity, and the RRWSG plans to further impact this area by future downstream enlargement of the currently proposed reservoir. The proposed pipelines associated with the King William Reservoir would require the clearing and maintenance of new linear easements, which would result in the conversion of mature wetland and upland habitat to early successional states.

Additionally, since HEP was not used to quantify habitat loss resulting from the new pipeline (directly associated with the new proposed reservoir), it is not consistent to attempt to apply HEP solely for compensation credit for this aspect of the project. In a memo dated 22 December 1998, the Service recommended that the RRWSG look to compensate for impacts to early successional species by managing existing overhead powerline easements on Newport News Waterworks property, not by clearing and maintaining new utility line easements. The King William Reservoir pipeline right-of-way does not represent a possible habitat compensation measure, but rather represents additional habitat impacts (see Section 8 f. (2) (b), Wetland Conversion Impacts). Therefore, the KWR-IV downstream areas and King William Reservoir pipeline management areas should be eliminated from the RRWSG's proposed compensation plan; and more reasonably should be considered as additional impacts to aquatic resources.

The RRWSG has proposed compensating for redbfin pickerel habitat loss through stream restoration on the South Anna River in Louisa County, Virginia, and has calculated habitat unit gains using the redbfin pickerel's HEP model. However, the District was unable to determine how the RRWSG quantified anticipated habitat unit gains for the redbfin pickerel when no details on the scope of stream restoration work in the headwater reaches of the South Anna River were provided in their Mitigation Program, Fish and Wildlife Mitigation Plan. The RRWSG never identified any existing potential mitigation sites for

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review by the interagency HEP team that might compensate for anticipated impacts to the redbfin pickerel. Since this aspect of the compensation plan was never reviewed by the interagency HEP team, the District questions the validity of applying the redbfin pickerel model to the proposed stream restoration area. The Mitigation Program, Fish and Wildlife Mitigation Plan, provides no details on what field data (if any) was collected from the proposed stream compensation sites, or other assumptions that would be needed to apply the redbfin pickerel model to the proposed compensation area. Without this information, the District must reject the applicant's claims for any redbfin pickerel habitat unit gains as stated in the Mitigation Program, Fish and Wildlife Mitigation Plan.

The interagency HEP team agreed that habitat losses associated with the proposed compensation measures (e.g., the proposed King William Reservoir buffer and wetland mitigation sites) would be noted qualitatively as losses, but would not be quantified and counted against the project since compensation measures are viewed as being a net benefit. For example, preservation of the proposed reservoir buffer would allow the forest to mature and technically result in loss of existing habitat for early successional species (e.g., yellowthroat). The HEP team acknowledges this loss of early successional habitat, but it is not counted in the total habitat loss for the overall King William Reservoir project. In Table 10-3 of the Mitigation Program, Fish and Wildlife Mitigation Plan, it should be noted that the habitat losses recorded for the proposed reservoir buffer were shown, but not used to calculate the overall habitat losses for the pileated woodpecker, pine warbler, brown thrasher, field sparrow, or yellowthroat.

With the reservoir, the currently proposed buffer, and the proposed wetland mitigation sites, habitat impacts would be fully offset for beaver, mink, great blue heron, wood duck, red-spotted newt, gray squirrel, brown thrasher and yellowthroat. The regional wildlife resource objectives represented in part by these evaluation species include: species that use riparian zones, species of seasonally saturated forested wetlands, species that use wetland scrub-shrub habitat and shrub habitats of later successional upland areas; species that use shallow permanently flooded wet areas, species of upland forests, species that utilize mast-bearing forests, and species that utilize early successional forest habitat. These evaluation species were also chosen to represent, in part, the following habitat types: palustrine forested wetlands, palustrine scrub-shrub wetlands, palustrine emergent wetlands, shallow water portions of lacustrine systems, cove hardwood forests, and early successional logged areas.

The RRWSG's compensation plan fails to offset habitat losses for the redbfin pickerel, pileated woodpecker, pine warbler, and field sparrow. The regional wildlife resource objectives represented by these evaluation species include: species that use wetlands, species sensitive to forest fragmentation, species that use mature hardwood forests, species of public importance, cavity nester species, species that are habitat specialists, and protection of habitat for forest interior dwelling birds. These evaluation species were also chosen to represent the following habitat types: low-gradient, slow-moving, vegetated riverine habitat; large unfragmented tracts of mature forest (cove hardwood, upland evergreen forest, upland mixed forest, and all forested wetland cover types); and early successional habitats.

The HEP analysis demonstrates that the proposed mitigation package does not fully compensate for either wetland or upland habitat losses from the King William Reservoir. The RRWSG's proposed compensation plan provides no compensation for impacts to redbfin pickerel habitat. This underscores how a diverse, low-gradient lotic system with associated vegetated wetlands cannot be compensated by an out-of-kind mitigation package comprised of a lentic/lacustrine reservoir and depressional wetland creation/restoration sites. Although the proposed reservoir buffer is large in acreage (estimated 1,990 acres), it would be comprised of a narrow forested band along the entire perimeter of the proposed

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reservoir. Habitat value would largely be limited to those species that utilize lacustrine riparian fringe (as defined in the HEP species models for beaver and mink), as was appropriately credited in the HEP study for the project.

The Environmental Issues Summary claims that “these analyses thoroughly demonstrate the benefits of the King William Reservoir coupled with successful implementation of the Mitigation Program will more than compensate for any functions and values reduced by construction of the King William Reservoir,” and “the replacement package would more than compensate for the wetland habitat impacted in the project area...[i]n addition to compensating for all wetland habitat losses from the King William Reservoir....” I strongly disagree. Despite claims to the contrary on page 4 of the letter from Newport News dated 27 November 2000 in response to EPA’s comments on the Environmental Issues Summary, there was never a consensus from the interagency HEP team that the King William Reservoir and mitigation sites would result in a net gain of habitat units; and no such documentation is included in the HEP Report. In accordance with Norfolk District practice, the HEP study identified theoretical compensation measures that would be required to provide full in-kind compensation for anticipated King William Reservoir impacts to wildlife habitat, but the RRWSG has never submitted a mitigation plan that would fully compensate for wetland dependent fish and wildlife habitat losses.

Comments Received on the RROD Regarding Habitat Evaluation Procedures: The City of Newport News claims that “in many aspects, the Norfolk District has manipulated the HEP process to minimize the projected benefits to fish and wildlife habitat from project implementation” and that they have been consistently opposed to the District’s selection of the 50-year project evaluation period for the HEP analysis. They argue the reservoir would remain long after the 50-year evaluation period and continue to be used for water supply long after the Peninsula’s water demand exceeds the supplies from the expanded reservoir system. It is true that the District insisted upon a 50-year period of analysis for the HEP study. It was not, however, to minimize the projected fish and wildlife benefits. The 50-year period of analysis was appropriate for the following reasons:

- It is consistent with the planning information presented in the EIS for this project. If another period of analysis was selected, changes in the EIS might have been required.
- It is the same period of analysis for the HEP studies of the Ware Creek and Black Creek reservoir alternatives.
- The longer the period of analysis, the less confidence there is in the accuracy of the future projections of habitat suitability, particularly for early successional and wetland dependent species. In the 10 June 1997 HEP Team meeting (see minutes prepared by Malcolm Pirnie and dated 23 June 1997), Mr. Dave Morris, Newport News project manager for the permit application, agreed that the HEP Team could use 50 years as the project life for the HEP analysis. All subsequent aspects of the HEP analysis used a 50-year period of analysis as was documented in the February 1999 King William Reservoir HEP Main Report (see page ES-1).

The applicant claims that using the restrictive 50-year evaluation period does not capture the fish and wildlife habitat benefits that would be gained from maturation of the upland buffer around the reservoir, and the 50-year evaluation period only captures a fraction of the benefits provided by the buffer since areas currently managed for pine and early successional areas will take many decades to mature into hardwood forest. While some types of habitat may develop or be maintained beyond a 50-year study

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window, the reliability of any associated habitat projections is less certain. The District noted that the reservoir buffer alone does not provide suitable habitat for the pileated woodpecker, a species included in the HEP study, because of the relatively thin width (200 feet) and convoluted nature of the buffer. The HEP team agreed that as much as 75 percent of the buffer area could provide habitat for this species provided that three additional forested areas of at least 70 hectares each abutted the buffer area. However, the currently proposed wetland mitigation plan does not incorporate any additional forested areas contiguous to the proposed reservoir buffer. At least 1/3 of the forested areas would need to be of a suitable size to support this species. These areas were not identified in the Final Report. Additionally, maturation and development of woody vegetation in the reservoir buffer would not provide suitable habitat for a number of early and mid-succession species included in the HEP study (see the table on page ES-3 of the Final Report). Specifically, maturation of the reservoir buffer would not compensate for habitat impacts to the pine warbler, field sparrow, or the common yellowthroat (a wetland dependent species). The reservoir and buffer area will not compensate for the loss of habitat suitable for the redfin pickerel (see the table on page ES-3 of the Final Report).

The City of Newport News stated that the limited 50-year project evaluation period also underestimates the fish and wildlife habitat provided by the proposed wetland mitigation sites. The applicant further stated that “since the mitigation sites would be protected in perpetuity [not including the proposed wetland and upland preservation areas situated downstream of the proposed King William Reservoir], upon reaching maturation, the mitigation sites would provide more suitable habitat than that currently provided by the wetlands in Cohoke Creek, which are subject to silvicultural impacts.” Although it may be true that a longer evaluation period might increase the habitat unit gains at the proposed wetland mitigation sites for species that utilize mature forested habitat, the claims that it would provide full, in-kind, habitat replacement for impacts to the Cohoke Creek system are unsubstantiated. In addition to stand age, an assessment with a longer evaluation period would still have to consider the physical configuration of the proposed mitigation sites as well as surrounding land uses that may lie outside of any protective deed restrictions.

The City of Newport News claims that the Norfolk District uses a double standard by refusing to acknowledge the habitat values provided by preservation of the 620 acres of uplands and 186 acres of wetlands downstream of the dam site, where no impacts are anticipated within the 50-year project life. The 806 acres of land (620 acres of upland and 186 acres of wetlands) located downstream of the proposed KWR-IV dam site were not part of the mitigation proposal that the RRWSG provided to the HEP team for evaluation. With the exception of the proposed downstream wetland and upland preservation areas, the applicant has agreed that all of their proposed mitigation sites be preserved in perpetuity. The downstream areas are not suitable for compensation credit because the applicant refuses to preserve them in perpetuity, and the proposed project would result in impacts to these downstream wetland reaches through alteration in hydrology and other factors (see pages 66 through 68 of the RROD). The functional assessments conducted for this project demonstrate the high likelihood that the proposed King William Reservoir would result in impacts to downstream portions of Cohoke Creek located upstream of the existing Cohoke Millpond.

The City of Newport News commented that various scenarios are presented in the HEP Study that provide full in-kind habitat compensation for impacts from the reservoir project, and that the four scenarios (presented in the HEP) are not meant to be a complete list of all possible mitigation combinations nor are they meant to indicate required mitigation. These statements are correct. The scenarios identified in the Final HEP Report (pages ES-6, 6-10 and 6-11) are only four possible scenarios that would fully offset the

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habitat losses for the evaluation species within the proposed reservoir site, while minimizing the acreage of compensation. However, the wetland mitigation plan currently proposed by the applicant does not provide full, in-kind habitat replacement for impacts associated with the proposed King William Reservoir.

The applicant claims that the Norfolk District misinterpreted the objectives and results of the HEP Study. They state the HEP was completed to “provide a tool for mitigation plan habitat evaluation,” and that the HEP Study did not evaluate their current mitigation package. They state the HEP methodology was applied by the applicant to the entire mitigation package to determine whether the project impacts would be offset. The District has not misinterpreted the objectives and results of the HEP study. The HEP Study was conducted in part to provide a tool for mitigation plan habitat evaluation (page ES-1 of the Final Report). It was used to identify potential compensation scenarios that would fully offset the habitat losses for the evaluation species within the proposed reservoir site, while minimizing the acreage of compensation (see pages ES-6 and 6-10 in the Final Report). The District agrees that these scenarios were not meant to indicate specific required compensatory mitigation; that is a permitting decision and was not the responsibility of the HEP team. The HEP study did evaluate a number of prospective mitigation sites to evaluate the potential habitat benefits associated with the use of those mitigation sites (see Chapter 5 in the Final Report). As described in the RROD (pages 69 to 76), the applicant has misapplied the HEP methodology to their mitigation package.

The City of Newport News continues to claim that “the mitigation package presented in the RRWSG’s May 1999 Mitigation Program, Fish and Wildlife Mitigation Plan does indeed fully compensate for wetland habitat losses from the King William Reservoir.” This is clearly an erroneous statement, for in this very same plan, the RRWSG states “[h]abitat impacts to species...requiring stream habitat, represented by the Redfin Pickerel, however, will not be fully compensated by the Mitigation Program” (pages 10-7 and 10-8). The applicant’s current mitigation package does not provide full, in-kind habitat replacement for impacts associated with the proposed King William Reservoir (see HEP Section of the RROD).

The applicant commented that consensus is not required for applying the HEP methodology to the final mitigation package, and that the interagency HEP Team did determine, as documented in the HEP Study, that the reservoir and buffer alone more than compensate for impacts to the regional wildlife resources objectives represented by the beaver and mink. Although consensus may not be required for application of HEP to the final wetland mitigation package, acceptance of any HEP application by the Corps would be facilitated if the underlying assumptions were agreed to in advance. This is especially true when the applicant applies HEP to situations outside of the study area that was defined as the proposed King William Reservoir pool area (e.g., vague stream restoration plans for the South Anna River, proposed new pipeline corridors, and downstream areas that are not proposed to be protected in perpetuity). According to the HEP study, the proposed reservoir and buffer would provide slightly more than full compensation for impacts to beaver and mink habitat. This was never disputed in the RROD.

The City of Newport News commented that several of the evaluation species that were chosen to represent the wetland habitats found within Cohoke Creek are compensated in the submitted mitigation package. The Final HEP Report (Chapter 5, Table 5-20) indicates that with the reservoir, the proposed 200-foot buffer, and the proposed six mitigation sites, habitat impacts were not offset for the following wetland dependent species: great blue heron, wood duck, yellowthroat, and redfin pickerel. In Malcolm Pirnie’s “Mitigation Program, Fish and Wildlife Mitigation Plan” (1999c) they applied the HEP

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methodology to all the proposed primary wetland mitigation sites. For reasons discussed in the RROD (page 74), the District did not accept their application of HEP to downstream temporary preservation areas, new pipeline corridors, and unspecified stream restoration work. The applicant's final mitigation package (even if fully successful) would not fully compensate for wetland and upland habitat loss represented by the redfin pickerel, pileated woodpecker, pine warbler, and field sparrow.

The City of Newport News stated that early successional habitat represented by the pine warbler and field sparrow indicator species is not limiting in Southeastern Virginia, and that early successional stages of the wetland mitigation sites will offset these losses. They also stated that "large contiguous tracts of mature forest, to include forested wetlands" as represented by the pileated woodpecker would be offset by downstream preservation of the Cohoke Creek corridor and a longer evaluation period for the preservation at the proposed mitigation sites. The early successional stages of the wetland mitigation sites do not fully offset the loss of early successional habitat units in the reservoir pool area. In fact, Table 5-20 in the Final HEP Report indicates that taken together, the reservoir pool, reservoir buffer, and mitigation sites do not fully offset habitat impacts for two early successional species: the field sparrow and yellow throat; a mid-successional species - the pine warbler; or a species dependent upon mature forests - the pileated woodpecker. The HEP Team was not tasked with applying HEP to the preservation of forested lands on Cohoke Creek downstream of the KWR-IV site, and this component is not an acceptable mitigation alternative for reasons cited in the RROD (page 74). This area was outside of the study area boundary. The study area was defined as the area proposed for reservoir creation (i.e. pool area; see page 2-1 in the Final HEP Report).

The City of Newport News claims they have appropriately applied the HEP methodology to the proposed stream restoration work in the South Anna River watershed and have demonstrated redfin pickerel habitat unit gains. Page 6-8 of the Final HEP Report indicated that neither the proposed reservoir nor the mitigation sites provided any mitigation for impacts to redfin pickerel habitat. Page 6-9 of the Final HEP Report indicates that approximately 44 stream miles of improved habitat would be required to offset redfin pickerel habitat losses associated with reservoir construction/inundation. As stated on page 74 of the RROD, the applicant has not even provided a viable conceptual stream restoration plan, therefore, the District cannot concur with the applicant's claims for any redfin pickerel habitat unit gains.

The City of Newport News stated that their use of averaged HSI scores was done in an appropriate manner consistent with the findings of the interagency HEP Team. They stated that the study concluded that habitat suitability values were less than 0.5 for five out of the twelve species evaluated within the project area, and that these results indicate that the habitat within Cohoke Creek is far from optimal for wildlife represented by these five species. While Habitat Suitability Index (HSI) values were on average less than 0.5 (out of a possible 1.0) for five evaluation species (wood duck, pileated woodpecker, pine warbler, brown thrasher, and the yellowthroat) that does not mean that the habitat within Cohoke Creek is less than optimal for these species. Examination of Table 3-1 in the Final Report indicates that for these five species, some of the study area provides less than optimal habitat, while other portions provide very good habitat. For example, while the average HSI value for the wood duck, a wetland dependent species, is 0.44, actual values range from 0.16 to 0.65. The combination of proposed reservoir, buffer, and six proposed mitigation sites do not offset impacts to wood duck habitat (Table 5-20 of the Final Report). Similar conclusions can be drawn from the analyses for the pileated woodpecker, pine warbler, and yellowthroat. I continue to defer to the expertise of the Service with regard to issues related to evaluation of the HEP study results, and again see no reason to disagree with their determination that the applicant misinterpreted the HEP results.

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Mr. Donald Rice, an employee of Newport News Waterworks, commented that during an interagency HEP meeting, when told that a 2 to 1 wetland mitigation ratio had been proposed to compensate for anticipated reservoir impacts, Dr. Dean Stauffer of Virginia Tech asked “Then why do you need HEP?” During the 17 April 1997 HEP meeting, as documented in minutes issued by Malcolm Pirnie, Inc. on 2 June 1997, the District had responded that for a project of this scope, a mitigation plan would be required that provides for compensation of wetland losses and addresses habitat losses, as determined by Habitat Evaluation Procedures.

Mr. R. Thomas Sankey of Malcolm Pirnie commented that the RRWSG “had envisioned a [HEP] process in which the habitat with and without the project would be fairly evaluated and at the onset proposed using a list of species to target all types of habitats including species that would reflect the value of the reservoir for fisheries and waterfowl.” He further claimed that the agencies eliminated species that would be representative of large open-water habitat (i.e., the proposed reservoir) since the HEP was to be used to evaluate the mitigation plan only and that compensation for open water habitat would not be required. The decision not to include any evaluation species that represented open water habitat was reached by consensus of the interagency HEP team that included representatives of the RRWSG. As noted in the RROD (page 70), it is not realistic to have all habitat types assessed by a single HEP study, and regional wildlife resource objectives were used to guide the species selection process.

On page 71 the RROD noted that the interagency HEP study did evaluate and credit the riparian zone and shallower margins of the reservoir. The deeper portions of the reservoir were not emphasized in the HEP study, because as noted in a 1994 publication by Tiner *et al.* entitled “Recent Wetland Status and Trends in the Chesapeake Watershed (1982 to 1989),” this type of habitat is not limiting factor in the Virginia Coastal Plain. Reservoirs/lakes/ponds were not identified as an important regional wildlife resource objective for this part of Virginia

Mr. Sankey also commented that the true diversity of the proposed King William Reservoir system was “not captured or even planned to be captured in the HEP process.” He stated the shallow water and deeper water systems that could be provided by the proposed King William Reservoir would add to the diversity of Cohoke Creek valley by adding new habitat types that never existed before. The District disagrees with his viewpoint because it overlooks the diversity of the Cohoke Creek wetland system that would be impacted. The RROD (page 60) lists “64 different cover types and hydrologic regimes” within the proposed reservoir pool area, which the City of Newport claims would be replaced with “...valuable deepwater habitat...valuable shoreline and shallow water habitat (including...submerged aquatic vegetation and ...emergent wetlands)” (i.e., three different habitat types).

(ii.) Wetland Evaluation Technique (WET): In 1993, without the benefit of input/concurrence on model assumptions from the District or any advisory agencies, the project proponents performed a Wetland Evaluation Technique (WET) study to qualitatively compare the probability of wetland functions for a proposed Ware Creek Reservoir site, a proposed Black Creek Reservoir site, and the proposed King William Reservoir (KWR-II configuration) as part of their alternatives assessment. The details of this exercise were reported by the RRWSG in the EIS.

In the Environmental Issues Summary, the RRWSG states that “numerous analytical techniques have been applied to evaluate the quality of the wetlands within the King William Reservoir project area, and mitigation sites,” and cites WET as one of these techniques. WET was not performed on any of the RRWSG’s proposed wetland mitigation sites; therefore, the RRWSG cannot make any claims that the

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WET study helps demonstrate their wetland mitigation package provides full, functional replacement of lost wetland functions. It is important to emphasize, as noted by Malcolm Pirnie in their WET study, that “the qualitative probability ratings assigned by WET are not direct estimates of the magnitude of a wetland function or value... [r]ather they are an estimate of the probability that a function or value will exist or occur in the wetland (to an unspecified magnitude).” Malcolm Pirnie further correctly states “probability ratings assigned by WET do not measure magnitude and consequently the assignment of numerical values to probability ratings are inappropriate and misleading.” The Norfolk District disagrees with the RRWSG’s inferences and conclusions that the WET results are an estimate of the magnitude that the Cohoke Creek wetlands in the King William Reservoir project area perform different wetland functions.

Although the existing Cohoke Creek system is recognized as being a diverse and complex wetland system, Malcolm Pirnie made the assumption that the entire wetland complex could be evaluated as a single assessment area. In the District staff’s opinion, this is an oversimplification of the Cohoke system and reduces the resolution of an already simplified rapid assessment methodology, which further limits the reliability of the WET results. Considering the Cohoke Creek wetlands as a single assessment area also runs counter to Malcolm Pirnie’s own reasoning in their subsequent Evaluation for Planned Wetlands (EPW) study where they state “the complex nature of the wetlands suggest[s] that each wetland functions slightly differently from the others...it was not feasible to assess the entire project area as one wetland.” (EPW is discussed in (iii) below). This error in defining the King William Reservoir assessment area led the RRWSG to erroneously conclude that the WET analysis identified the Cohoke Creek wetlands as providing “low aquatic diversity and abundance functions” in the Environmental Issues Summary. Limited knowledge of the Cohoke system at the time Malcolm Pirnie conducted the WET study is illustrated by the fact that they estimated the extent of wetlands to be 293 acres for the KWR-II configuration. This was clearly a gross underestimation of the wetland acreage in the KWR-II project area because a later detailed wetland delineation of this same project area identified 574 acres of wetlands (an error of 196%).

The WET study emphasized how a few characteristics of the King William Reservoir assessment area influenced several of the wetland function ratings. For example, the fact that the King William Reservoir assessment area represents a large percentage of the total palustrine wetlands within the Cohoke watershed appeared to be a controlling factor in the social significance ratings for the following functions: groundwater recharge, groundwater discharge, sediment/toxicant retention, nutrient removal/transformation, aquatic diversity and abundance, and uniqueness/heritage. This underscores how the elimination of the majority of headwater wetlands in the upper Cohoke Creek watershed by construction of the King William Reservoir would likely result in the loss/reduction of diverse wetland functions within the downstream portions of the Cohoke valley.

In the Environmental Issues Summary, the RRWSG states “based on the WET analysis, the wetlands within the [King William Reservoir] pool area received low scores for nutrient removal/transformation.” Notwithstanding the problems and limitations of the WET study as outlined above, this finding contradicts their own subsequent EPW evaluation that concluded “the [EPW] evaluation indicate[s] the existing [Cohoke Creek] wetlands provide a high degree of sediment stabilization and water quality functions” as stated in the Mitigation Program, Fish and Wildlife Mitigation Plan. Although their EPW study had shortcomings of its own (see below), the Cohoke Creek wetlands are assumed to perform important sediment stabilization and water quality functions due to the low gradient nature of the Creek

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and generally slow water movement through extensive vegetated wetland systems and beaver pond complexes.

In the Environmental Issues Summary, the RRWSG stated the WET study demonstrates that the Cohoke Creek wetlands scored low on groundwater recharge, and provide only moderate export functions. Most wetlands in the Cohoke Creek area are underlain by fine-textured soils with low permeability rates, so it does seem reasonable for the project area wetlands to have a low probability for groundwater recharge functions. The Norfolk District agrees. Since the Cohoke Creek wetlands are part of a low gradient riverine system it seems reasonable to expect that they have at least a moderate probability of performing export functions.

The project proponent's original goal of the WET study was to use it as a screening tool to evaluate three proposed reservoir alternatives. Despite the shortcomings of the study assumptions as detailed above, the District did not object to this application of WET considering the stated goal and the fact that the level of review (and error) was applied uniformly to the three alternatives. The RRWSG has tried to use the results of WET's relative comparison of wetland functions between three different reservoir alternatives to make specific conclusions about the magnitude of functions performed by the Cohoke Creek wetlands. This is clearly a misinterpretation of the WET study results, and is a misapplication of a simple assessment methodology beyond its intended use. I must, therefore, reject this use of the WET study by the RRWSG.

Comments Received on the RROD Regarding the Wetland Evaluation Technique (WET): The City of Newport News stated that based on the WET methodology, it is appropriate to analyze the wetlands within the King William Reservoir pool area as a whole since the wetlands are hydrologically connected and occupy the same topographic position. Actually the wetlands within the King William Reservoir pool area do not occupy the same topographic position, which is one of the reasons documented in the RROD (page 76) that the District considers this assumption to be an oversimplification of the Cohoke Creek wetland system and greatly limits the results of an already general assessment methodology. Additionally, this contradicts Malcolm Pirnie's own reasoning in defining assessment areas for the EPW study as discussed in the RROD.

The City of Newport News commented that the initial estimate of 293 acres of wetlands within the project area was identified using NWI mapping, and that their underestimation of the extent of wetlands has little bearing on the "quality assessment" provided in the WET analysis. The District mentioned this error in the RROD because if the applicant did not accurately estimate wetland acreage at the time of the WET study, it raises questions about the accuracy of the WET assessment to estimate the probability of different wetland functions occurring in the project area.

The City of Newport News cited the WET Manual (USCOE, 1987) as not requiring an interdisciplinary team to use WET. Additionally Newport News commented that the Federal agencies have had the results of the WET analysis since initial publication in the DEIS in 1994 and have never questioned the methodology or the results until the RROD. It is true that a WET study does not require an interagency team, but if the applicant expects the District to accept the findings of such a study, then it makes sense that they would seek input on assumptions and limitations prior to investing time and resources on the study. As noted on page 77 of the RROD, the District did not object to the initial application of the applicant's WET study to compare the three proposed reservoir alternatives since any error was uniformly applied to each alternative. The applicant has more recently misapplied these same WET study results

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(RRWSG, 1999c and Malcolm Pirnie, 1999c) to make unsupported statements regarding the level of wetland functions within the project area. The District continues to reject this use of the WET study by the applicant for the reasons stated above.

The City of Newport News commented that the District has failed to provide other analyses to substantiate its claim that the conclusions of the WET analysis are erroneous, and is only now rejecting the WET evaluation after having published the results in its own DEIS and FEIS. Pages 76 and 77 of the RROD fully describe the shortcomings of the applicant's WET study. As discussed above, the District rejects the new misapplication of the WET results by the applicant, but not the original premise for its utilization.

Since some of the conclusions of the WET analysis do not contradict statements in the RROD, the City of Newport News feels this lends some credibility to the WET analysis. The flaws of the applicant's WET study are described in detail in the RROD (Section (ii) on pages 76 and 77). The District makes no claim that although based on flawed assumptions, that the WET study must be completely wrong on each assessed wetland function. The RROD simply points out the larger errors of the WET study so that the record adequately reflects the limitations of the study.

(iii.) Evaluation for Planned Wetlands (EPW): In 1996 the project proponents, without the benefit of input/concurrence on model assumptions from the District or any advisory agencies, performed an Evaluation for Planned Wetlands (EPW) study that reportedly compared the wetland functions of the existing wetlands within the King William Reservoir project area (KWR-II configuration) to the collective wetland functions of several proposed wetland mitigation sites. The details of this exercise are given in the Regional Raw Water Study Group Conceptual Mitigation Plan for the Department of Environmental Quality. In a letter dated 23 February 1996, the U.S. Fish and Wildlife Service stated that EPW is too limited to be solely used to evaluate lost wetland functions resulting from construction of the King William Reservoir. More specifically they were concerned that as a rapid assessment technique, EPW inherently has a low level of accuracy, is intended for smaller acreages, and the assessment level is too coarse to be applicable to such a large wetland complex as the Cohoke Creek system.

The Service stated that the results of an EPW assessment could be useful as long as its assumptions and limitations were recognized. In a letter dated 7 March 1996, the EPA concurred with the recommendations of the Service. Malcolm Pirnie had collected the EPW field data for the King William Reservoir project area in mid-February 1996, but it was not until their letter of 27 March 1996 that Malcolm Pirnie requested concurrence from the reviewing agencies on the goals and assumptions of the EPW study. In a letter dated 28 March 1996, the District stated that while EPW can be a valuable tool for rapid assessment of small wetland areas, it is too limited to provide the detail needed for analysis of the King William Reservoir. In a response letter dated 4 April 1996, the Service stated it was unfortunate that Malcolm Pirnie did not coordinate the assumptions and goals before collecting the field data, and found "the assumptions made by Malcolm Pirnie for evaluating the planned wetland to be without scientific merit in the case of the proposed King William reservoir site, and rejects them as inappropriate." EPW classifies non-tidal wetlands into three broad categories: non-tidal (stream/river), non-tidal (pond/lake) and non-tidal (depression). Using this simplistic classification scheme, the Cohoke Creek wetlands would be considered to be of the non-tidal (stream/river) class, the proposed reservoir would be classified as non-tidal (pond/lake), and the majority of the proposed mitigation sites would be classified as non-tidal (depression). The proposed King William Reservoir and wetland mitigation sites represent

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lentic/depressional systems, and clearly cannot provide in-kind replacement for the anticipated impacts to the Cohoke Creek lotic/riverine system.

Several of the wetland mitigation sites used in the EPW study have since been determined to be unacceptable after subsequent review by the District and other advisory agencies. Also, it is important to note that in addition to candidate mitigation sites that had actually been identified by Malcolm Pirnie staff, approximately 510 acres of unidentified “additional sites” were evaluated, and without explanation, given quantitative scores of functional capacity for each of the six wetland functions assessed by EPW as part of the RRWSG’s 1996 mitigation package. The total wetland acreage of the mitigation sites used in the EPW study was 1100 acres, which is at least 294 acres more than the RRWSG has ever reported to have actually found for mitigation.

Another drawback of the EPW study was that the timeframe for assessment of the mitigation sites was assumed to be when these sites are fully functional, self-sustaining, mature systems. It completely disregards the temporal loss of functions for more structurally complex wetlands (e.g., forested wetlands) that occur while the system matures, which can make up a substantial portion of the 50-year project evaluation period.

In the Environmental Issues Summary, the RRWSG states that “numerous analytical techniques have been applied to evaluate the quality of the wetlands within the King William Reservoir project area, and mitigation sites,” and cites EPW as one of these techniques. Considering the above, the District staff believes that the RRWSG’s claim that their EPW study compares the wetland functions of the Cohoke Creek wetland system to the proposed mitigation sites is unsupportable. The Cohoke Creek system and the proposed mitigation sites belong to at least two different EPW wetland classes (i.e. are out-of-kind), and comparisons between them cannot be validly made. Additionally, almost half of the study’s total mitigation acreage was comprised of sites to be identified in the future, which artificially inflated the Functional Capacity Unit scores for the proposed wetland mitigation sites. The ability of EPW to assess the degree to which the Cohoke Creek wetlands perform different wetland functions is discussed below.

EPW was mainly designed for assessing and comparing a wetland assessment area against a planned (created/restored) wetland. In this case the wetland assessment area is broadly considered to be the Cohoke Creek wetland complex in the KWR-II project area. Malcolm Pirnie chose to break the Cohoke Creek wetland complex into six wetland assessment area categories based solely on vegetative cover type (e.g., forested, forested/emergent, forested/scrub-shrub, emergent, etc.). By focusing solely on cover type for defining wetland assessment areas, the EPW study lumped wetlands with different landscape positions and hydrologic regimes all together within the same wetland assessment area. The EPW study obscures any realistic assessment of the functional capacity of the Cohoke wetlands by including several different wetland functional groups within a single wetland assessment area category. As was the case with the RRWSG’s WET assessment, this oversimplifies the Cohoke wetland system, and can lead to erroneous and unsupportable conclusions.

In the Environmental Issues Summary, the RRWSG claims the EPW study shows that the Cohoke system only provides a moderate degree of fish and wildlife functions. Since the fish and wildlife functions of the Cohoke Creek wetlands were assessed by a more data-intensive HEP investigation, those results are considered to be more accurate than the EPW study. According to the applicant’s EPW study, the Cohoke Creek wetlands in the project area scored high for shoreline bank erosion control, sediment stabilization, water quality, and uniqueness/heritage functions.

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Comments Received on the RROD Regarding the Evaluation for Planned Wetlands (EPW): The City of Newport News takes exception to the statement in the RROD that the Service felt that it was unfortunate that Malcolm Pirnie did not coordinate the assumptions and goals before collecting the field data (for the EPW), and found the assumptions made by Malcolm Pirnie - to be without merit. The City stated the EPW analysis does not rely on consensus of issues, and that Malcolm Pirnie did indeed coordinate these activities with the Norfolk District. The statements of the Service and EPA are accurately recorded in the RROD. As with the WET study, the applicant is correct in stating that the EPW methodology does not require an interagency team. However, if the applicant expects the District to accept the findings of such a study, then it makes sense that they would seek input on assumptions and limitations prior to investing time and resources on the study. As stated by the applicant, District staff members did attend a 1-day training session on EPW, and briefly attended a preliminary field review where potential use of EPW for the King William Reservoir project was discussed. However, the District never advocated the use of EPW, and as noted in the RROD (page 78) provided a letter dated 28 March 1996 stating the EPW methodology was too limited to provide the detail needed for analysis of the King William Reservoir.

In a 27 March 1996 letter to the Norfolk District, the City of Newport News notes that Malcolm Pirnie requested concurrence on the EPW methodology and commented on the goals and assumptions made for evaluating the planned wetland from the reviewing agencies. This correspondence is noted in the RROD, but the applicant requested concurrence on the study assumptions after the field data had already been collected. This is why in a follow-up letter dated 4 April 1996, the Service stated that it was unfortunate the assumptions and goals of the EPW study were not coordinated prior to collection of the field data.

The applicant does not feel that the EPW analysis obscures “any realistic assessment of the functional capacity of the Cohoke wetlands by including several different wetland functional groups within a single assessment area” as stated the RROD. They stated that the sampling locations were selected for each wetland type using cover type mapping prepared for the HEP study, and that data for the sites were averaged for each function by cover type. The District strongly disagrees with the applicant on this issue. As stated in the RROD (page 79), by solely relying on covertype for defining wetland assessment areas, the applicant’s EPW study erroneously lumps together wetlands with different functions. The example given in U.S. Army Corps of Engineers, Norfolk District (2001d) is that using the applicant’s criteria, a single wetland assessment area class could include a semipermanently flooded forested wetland associated with a high order stream and a seasonally saturated forested wetland associated with a low order stream reach. References already cited in the RROD clearly describe how such systems differ functionally (e.g., Brinson, 1993a; Cummins, 1979; and Meyer and Wallace, 2001), and by lumping them in the same wetland assessment area class, the resolution of the analysis is lost. The HEP study largely avoids this pitfall because in general it assesses wildlife habitat suitability based on the structural composition of the vegetation community (i.e., cover type), and where hydrodynamics of the system are important, there are specific model variables that address these issues (e.g., beaver and mink models).

The City of Newport News implies that there is some significance in the fact that the EPW results were incorporated into the EIS for the King William Reservoir. The City has previously stated their belief that information contained in the EIS should be considered completely accurate and final and that the District should not change its determinations with regard to findings stated in the EIS. However, this notion runs contrary to the concept of NEPA to solicit comments and input from the public regarding the issues presented in the EIS. Until a final decision is made, analysis of any particular issue is incomplete. The EPW was incorporated into the EIS since no other functional assessment had been completed at that time, and it was thought to provide additional information regarding the project to the general public. The

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preliminary nature of the assessment was obvious since almost half of the wetland mitigation acreage assessed in the EPW study was comprised of unidentified sites.

As stated in the RROD, among other problems, the EPW study only evaluated the proposed mitigation areas as fully mature, functioning systems and disregarded the lag time necessary for these sites to mature. The City of Newport News stated that the 50-year project evaluation period was identified only as a matter of convenience for accounting purposes for the HEP Study, and should not be applicable to the EPW study since they claim the forested wetland mitigation will provide far more benefits after maturing than is credited within an arbitrary 50-year timeframe. The District believes that the functional assessments should be evaluated over the same time frame and be consistent with the planning information presented in the EIS for this project. Additionally, the independent review of the wetland mitigation plan by Darke *et al.* (2001) concludes that the current site designs of the proposed wetland mitigation sites would yield wetter systems that are unlikely to naturally succeed to forested wetlands. Therefore, the District maintains that the EPW should not have simply ignored the temporal loss of wetland functions that would occur while the proposed wetland mitigation sites would be maturing.

(iv.) Total Net Primary Productivity (TNPP): Without the benefit of input/concurrence on assumptions from the District or **most of the** advisory agencies, the project proponents performed a Total Net Primary Productivity (TNPP) study in 1998 based largely on published information to compare estimated TNPP values for existing conditions to predicted future conditions. More specifically, TNPP estimates for existing Cohoke Creek communities within the proposed KWR-IV project area and existing land uses of proposed mitigation sites (i.e., cropland and mined sites) were compared to the predicted future conditions of the King William Reservoir with a wetland fringe and fully mature wetland mitigation sites.

TNPP is a measure of the rate at which solar energy is converted into chemical energy and stored by primary producers, less the amount of energy expended to maintain the metabolism of the primary producers. TNPP is usually expressed in terms of the amount of carbon fixed per unit area per unit time. Rates of TNPP are variable and fluctuate with environmental conditions and stresses on the environment. As such, TNPP is a fundamental ecological variable that provides some insight into energy (carbon source) input to an ecosystem, as well as trends due to changes in land use. TNPP for vascular plant communities is calculated by summing two components, aboveground net primary productivity and belowground net primary productivity. It appears that the belowground net primary productivity component was not factored into the applicant's TNPP assessment.

There is some concern regarding the reference sites used to estimate TNPP values for the open water and littoral zone of the proposed King William Reservoir. The RRWSG did not provide enough information to assess the validity of using the open water productivity data sources, and they failed to demonstrate that the extent of fringe wetland development could be quantified. Although the two cited reference reservoirs are located in the eastern United States (Occoquan Reservoir in Virginia and Dog Lake in Georgia), the degree that they may be similar/dissimilar to the proposed King William Reservoir in depth, seasonal stratification patterns, trophic state (e.g., oligotrophic, eutrophic, etc.), littoral/pelagic ratio, growing season, landscape position, presence/absence of stream inputs, catchment size and catchment land use composition was not factored into the assessment, but can greatly influence TNPP values.

Other factors that complicate the direct extrapolation of TNPP data from existing reservoirs to the proposed King William Reservoir is the fact that the proposed reservoir would not be a terminal reservoir,

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and the proposed Mattaponi River pumpover would be the major source of water for the new reservoir. The proposed pumpover would transfer water from a low landscape position (lower reaches of the Mattaponi River) to a much higher landscape position (upper reaches of Cohoke Creek). The nutrient content, turbidity, residence time within the pool area before being transferred to the Newport News Waterworks distribution system, etc., would all have to be factored in to calculate TNPP rates for the proposed King William Reservoir. Information provided by the applicant already shows that some predicted water quality characteristics (i.e., nitrogen and phosphorus levels) of the proposed pumpover are very different from that of the existing Cohoke Creek project area. Because of the Mattaponi pumpover and continual reservoir withdrawals, the overall water quality of the proposed King William Reservoir would be very unlike any other existing reservoir even if it were sited in a similar landscape position.

As with any study, the validity of the assumptions dictates the reliability of the conclusions. An oversight common to most of the “functional assessments” undertaken solely by the project proponents is that they overlooked the time delay it takes for the wetland and upland creation/restoration sites (i.e., early successional habitats such as cropland, recent clearcuts) to develop into mature forested wetland and upland habitats. Although this temporal loss can account for a large portion of the 50-year study period, the project proponents continually evaluated the proposed mitigation sites as fully mature systems starting the first year these compensation sites would be constructed. This is not a realistic assumption and can lead to inflated estimates of functional gains from the proposed mitigation sites over the project evaluation period. More accurate trends could be estimated using the same methodology as employed by the King William Reservoir interagency HEP team.

In order to obtain a more accurate indication of the anticipated change in TNPP for the overall project, District staff recalculated Malcolm Pirnie’s model using the modified TNPP figures for swamp forest and cropland which incorporate an estimate of Belowground Net Primary Productivity. With the District’s modifications, the King William Reservoir (including mitigation sites) would result in an increase in aquatic TNPP of between 6,600 and 3,300 tons of carbon per year, and a decrease in terrestrial TNPP of between 14,600 and 7,300 tons carbon per year. Therefore, the King William Reservoir (including mitigation sites) would result in an overall loss of TNPP between 8,000 and 4,000 tons carbon per year. It is important to note again that these numbers only represent general trends, because of the problems with TNPP estimates for other vascular plant cover types and other flawed assumptions of the assessment. If more realistic TNPP estimates were used for all cover types, in all likelihood the King William Reservoir would result in an even greater net loss of TNPP, because the TNPP estimates for the other vascular plant cover types were underestimated. (A more detailed discussion of the problems with the assumptions made in this study, can be found in the Functional Assessments Section of the Norfolk District’s report entitled “Analysis of wetland and habitat impacts and the Regional Raw Water Study Group’s proposed compensation for the proposed King William Reservoir.”)

Without considering the off-site mitigation sites (existing or proposed conditions) and looking only within the proposed pool area of the Cohoke valley, the King William Reservoir would still result in a net loss of TNPP. This loss results from the conversion of a natural and productive upland/wetland riverine complex (Cohoke valley) to an artificial and relatively unproductive open water habitat (King William Reservoir). An important point not addressed at all by the project proponents is the way these two systems are inherently different, not only in TNPP rates, but also in the fate of fixed carbon from a landscape perspective. Although influenced by the composition of its catchment, TNPP cycles in reservoirs are generally closed; therefore, claims by the RRWSG that TNPP within the proposed King William Reservoir proper constitutes a net benefit to the Pamunkey River or the Chesapeake Bay are misleading.

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Riverine systems differ in that organic matter originating and processed (i.e., broken down to different degrees) in the upper reaches of the stream network are transported downstream and utilized by sequentially lower reaches of the stream network. In The Ecology of Regulated Streams, Cummins describes the nutrient spiraling concept of lotic (riverine) systems as “the dependence of downstream communities on upstream processes--communities in each successive stream order are dependent upon the inefficiency or ‘leakage’ from the preceding orders.” He goes on to describe the river continuum concept as “the balance between primary production and respiration, and between storage-processing and export constitute basic features of lotic systems that change along a continuum with stream order and would be significantly affected by altered flow regime.”

Impounding a large portion of the headwaters and associated riparian areas of Cohoke Creek to construct the King William Reservoir would result in a severe alteration to the existing balance, and there would be impacts downstream at least to and including Cohoke Millpond. The proposed King William Reservoir dam would have the potential to significantly reduce the amount of fixed carbon and inorganics that are transported to and support downstream portions of the Cohoke Creek system. This viewpoint is consistent with Malcolm Pirnie’s own statement that the existing Cohoke Millpond prevents “the aquatic productivity of upstream [Cohoke Creek] wetlands from being available to the downstream tidal Pamunkey River system.” In the letter from Newport News dated 27 November 2000 (page 3) responding to EPA’s comments on the Environmental Issues Summary, this same viewpoint was reiterated as “Cohoke Millpond Dam also blocks nutrient and sediment export to the York River Ecosystem and has, therefore, altered the hydrology of Cohoke Creek.” Therefore, construction of the King William Reservoir has the potential to also alter TNPP rates both within the reservoir pool area and also to downstream reaches of Cohoke Creek, and yet these impacts have not been addressed in Malcolm Pirnie’s TNPP assessment.

Comments Received on the RROD Regarding Total Net Primary Productivity (TNPP): The City of Newport News claims that the methodology used to assess changes in TNPP trends was discussed at an agency meeting where EPA agreed to participate in the study, and that EPA provided input and review throughout the process. An assessment of TNPP was briefly mentioned at an interagency meeting and EPA offered to provide references if needed, but the specific assumptions for the applicant’s TNPP assessment were never discussed at an interagency meeting or provided to the District. The District has since learned that EPA did provide informal input on the assessment (EPA personal communication, 14 June 2001), and the Final RROD has been revised to reflect this change. Regardless, the assumptions and limitations of the TNPP assessment were never discussed with the District, and I stand by the evaluation of the TNPP assessment as provided in the RROD (Section (iv.), pages 79 to 81) and as clarified below. The TNPP assessment was not a major factor considered in my decision, and it is only covered in detail here to respond to the comments received from the City of Newport News. The majority of the City's comments were in response to the review provided in the District’s 2001 report referenced in the RROD entitled, “Analysis of Wetland and Habitat Impacts and the Regional Raw Water Study Group’s Proposed Compensation for the King William Reservoir,” which was summarized in the RROD.

The RROD states that the applicant never provided information to assess the degree to which the reference reservoir sites are similar or dissimilar to the proposed King William Reservoir. The City of Newport News has responded that they searched for and used data (e.g., drainage area, chlorophyll, littoral zone, surface area and other factors) on similar reservoirs. As cited in the RROD (page 79), the applicant has still not provided any information to the District to demonstrate the similarity of the

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proposed reference reservoirs to the proposed King William Reservoir. Soranno *et al.* (1999) demonstrate that lakes in a similar landscape position will often have similar lake variables. On page 80, the RROD notes that there are several complicating factors that would make it difficult to extrapolate data from even a reference reservoir situated in a similar landscape position, most notably the proposed pumpover from the Mattaponi River.

The City of Newport News acknowledged that they disregarded belowground net primary productivity (BNPP) for vascular plant communities in their TNPP assessment. They claim only aboveground net primary productivity (ANPP) is important because “it measures the carbon readily available for transport to higher levels in the food chain.” This is an erroneous assumption. Not all ANPP is available for transport to higher levels in the food chain and depending on covertype, landscape position, etc., much of the ANPP may enter the detrital system as does much of the BNPP. Conner (1994) states “Litterfall accounts for an average of 43% of the aboveground primary production in wetlands forests. Very little is known about belowground processes, although there is evidence that roots contribute as much as or more to the detrital pool than does litterfall.” Working in forested wetlands of Virginia, Day and Megonigal (1993) state “The overemphasis on aboveground features of forested wetlands also extends to estimates of primary production and organic turnover...roots can represent a highly significant contribution to system productivity...roots contribute as much as 60% of the annual increment to soil organic matter.” They further point out that “ecosystem-level patterns and relationships cannot be inferred from aboveground data alone.” More recently, Day and Megonigal (2000) conclude “Failure to include belowground features in an ecosystem analysis can lead to erroneous conclusions and a misrepresentation of that ecosystem.” ANPP and BNPP are equally important in assessing TNPP trends because they both influence organic matter concentrations that in turn influence nutrient dynamics and sustainability of primary productivity rates.

The City of Newport News stated that they included a productivity rate for Agricultural Fields which arguably was conservative since the majority of carbon is removed from the system (corn stalks and all) and is not available for export to the food chain. Since the fixed carbon from existing cropland is generally utilized for human and/or livestock consumption, the District does not agree with the RRWSG’s position that this carbon is “not available for export to the food chain.” The RRWSG uses a very outdated estimate of cropland productivity and completely ignores the BNPP component of all vascular plant cover types (both upland and wetland). If the TNPP assessment was so narrowly viewed as advocated by the RRWSG as to dismiss fixed carbon that is “not available for export to the food chain,” then the bulk of the predicted productivity of the proposed King William Reservoir would have to be ignored since the majority of fixed carbon in lacustrine systems is sequestered to the sediments and generally would be unavailable to any wildlife that might use the reservoir or downstream reaches of Cohoke Creek (see page 81 of the RROD and U.S. Army Corps of Engineers, 2001d).

The City of Newport News commented that if they used the assumption that BNPP makes up one-half of the TNPP, the project with the mitigation sites provides a net increase in primary productivity. They also stated that the productivity rates used for wetlands in the RRWSG analysis compare and are even higher than the District’s recommended TNPP numbers listed in Esser *et al.* (2000). The District continues to believe it is essential to include BNPP in the assessment of TNPP, and the applicant’s assessment is flawed since it neglected to address this issue. The City of Newport News has misinterpreted the District’s modifications, which does not propose direct use of the TNPP numbers listed in Esser *et al.* (2000). Additionally, as described in detail in U.S. Army Corps of Engineers (2001d), the proposed recalculations would require modification of cropland and forested wetland TNPP values. As correctly

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outlined in the RROD (page 80), with these modifications the proposed King William Reservoir and wetland mitigation sites would result in an overall decrease in TNPP. Additionally, the applicant continues to claim the proposed wetland compensation sites will have a riparian forest component (RRWSG estimates 175 acres) with characteristic productivity rates, and yet as noted in U.S. Army Corps of Engineers (2001d) the applicant has not described how they defined “riparian forest.” It is questionable whether the proposed wetland compensation sites would provide any significant amount of riparian forest considering the independent review of the applicant’s wetland mitigation plan by Darke *et al.* (2001) that concludes “the new [proposed wetland compensation] sites would largely be small, isolated, depressional wetlands with very little connection to adjacent natural wetlands or streams.” Darke *et al.* (2001) also state the wetland mitigation sites would most likely be too wet to succeed to forested wetlands, which if correct would greatly influence the TNPP assessment findings. I concur with these conclusions.

The RROD stated the applicant’s TNPP study contained an oversight because the RRWSG only evaluated the proposed mitigation sites as fully mature systems and did not factor in temporal losses that could account for a large portion of the 50-year study period. The City of Newport News commented that such a statement was inappropriate since the “TNPP does not calculate total tons over a time period; rather, it is a rate and is only considered as a rate by ecologists.” The District recognizes that TNPP represents a rate. Although the RRWSG stated that it is incorrect to calculate the total tons of fixed carbon over a set time period, that is exactly what they did in their TNPP assessment when they erroneously concluded “A net increase in total net primary productivity between 1,500 and 3,400 tons of carbon per year would, therefore, be expected with successful project implementation” (Malcolm Pirnie, 1999c, page 10-4). As correctly described in the RROD and U.S. Army Corps of Engineers (2001d), the proposed King William Reservoir and mitigation sites would result in an overall reduction in TNPP. The District believes that the functional assessments should be evaluated over the same time frame and be consistent with the planning information presented in the EIS for this project (i.e., 50-year study period). Even though TNPP is a rate, the applicant should have addressed temporal losses by using a TNPP appropriate for early successional stages.

The City of Newport News stated that they did recognize the downstream impacts to Cohoke Creek from the loss of TNPP in the King William Reservoir basin, which was why they were proposing mitigation. They claim one purpose of the mitigation was to offset functional losses (including TNPP) from the wetland to reservoir conversion. This is the first time that the RRWSG has acknowledged there would be impacts to the downstream portions of Cohoke Creek (i.e., impacts from the proposed reservoir would exceed 403 acres of vegetated wetlands), in agreement with the District’s position as documented in the RROD. The RRWSG had previously taken the position that the wetland impacts would be limited to the proposed King William Reservoir pool area only, and that the submitted final mitigation package would provide full functional replacement for those wetlands. As discussed in the RROD, the applicant’s final mitigation package does not provide functional replacement for impacts to Cohoke Creek wetlands in the proposed reservoir pool area, and does not address at all those impacts to downstream portions of Cohoke Creek.

The City of Newport News claims that the Norfolk District is mistaken in its interpretation of the Defries *et al.* (1999) information on TNPP and therefore, our assumptions are incorrect for rerunning the TNPP calculations. Defries *et al.* (1999) state that overall NPP has decreased due to land disturbance and forest conversions; however, they go on to state that a significant regional effect was noted in North America where conversion from forests to cropland has increased natural NPP by more than 50% due to high

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fertilizer and water inputs. The City of Newport News is mistaken in the claim that the information in Defries *et al.* (1999) was used in the recalculations of TNPP as presented in the RROD, and the District's assumptions for the TNPP recalculation are sound.

The City of Newport News also commented that the ANPP forested wetland values in Burke *et al.* (1999) are well within the range of ANPP values used for forested wetlands in their TNPP assessment. Although the applicant's TNPP assessment does not even mention ANPP or BNPP, the District acknowledges that their figures for forested wetlands are within the published ANPP range for forested wetlands (see U.S. Army Corps of Engineers, 2001d). Additionally, the RRWSG implies that because Burke *et al.* (1999) concentrated on ANPP that this should be the primary metric for the King William Reservoir TNPP assessment. The Burke *et al.* (1999) study concentrated on ANPP because they were interested in comparing the quality of litterfall for different plant communities exposed to differing hydrologic regimes. That study goal differs from the goal of the TNPP assessment to look at potential changes in overall TNPP that would result from construction of the King William Reservoir. As discussed in U.S. Army Corps of Engineers (2001d) and further clarified above, the applicant has erroneously disregarded the importance of BNPP.

(v.) Sediment Retention and Nutrient Assimilation: In 1998 the project proponents, without the benefit of input/concurrence on assumptions from the Corps or **most of the** advisory agencies, performed an evaluation that compared predicted nutrient assimilation and sediment retention rates of the existing Cohoke Creek watershed and the Mitigation Site watersheds to the predicted post-project conditions. These studies were based largely on published information and assumptions made by the applicant. The findings of these exercises are summarized in the RRWSG's Mitigation Program, Fish and Wildlife Mitigation Plan and the Environmental Issues Summary.

Malcolm Pirnie made the assumption that maximum nutrient assimilation and sediment retention functions would be performed the first year after construction of the project. Although this may be a reasonable assumption for comparisons in the Cohoke Creek watershed, it would tend to overestimate benefits in the watersheds of the mitigation sites since it would take a large portion of the project evaluation period for the proposed mitigation sites to mature. Changes in these functions could be more realistically quantified by assessing temporal differences by successional stage as was done for the HEP.

To obtain more realistic predictions of existing nutrient loading rates and sediment loss at the proposed compensation sites, landscape position, proximity of other cover types and existing use of cropland/forestry/mining best management practices (BMPs) should have been evaluated. The York River is considered a non-point source dominated system, and the utilization of BMPs is the focus of the state's water quality control strategy for this waterway. These factors were not considered by Malcolm Pirnie, and average estimated loading rate values were simply applied to the different cover types with the assumption that pollutant loads (nutrient and sediment) for the different cover types would ultimately end up unabated in the Chesapeake Bay. Such generalizations could easily result in estimates that are not representative of actual pollutant loading rates or sediment loss within the watersheds of Cohoke Creek or the proposed mitigation sites. There is no question that conversion of cropland to pre-disturbance wetland/upland forest conditions will result in reduced nutrient and sediment loading rates from these areas, but there are other factors that need to be considered. Any conclusions drawn from this study should recognize the limitations and general nature of the assessment.

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The project proponents summarized the results of their assessment of nutrient and sediment retention in Table 10-2 of their final Mitigation Program, Fish and Wildlife Mitigation Plan. The areas of the Cohoke Creek watershed and the Mitigation Site Watersheds were evaluated and the nutrient and sediment retention for existing and proposed cover types was compared. The acreage of existing coverytype for the Cohoke Creek watershed was the same as that of the proposed coverytype; however, in evaluating the Mitigation Site Watersheds, Malcolm Pirnie disregarded the acreage of the actual mitigation areas. Therefore, the proposed coverytypes in the Mitigation Site Watersheds consisted of 794 acres less than in the existing coverytypes. Malcolm Pirnie assumed it was valid to exclude this acreage from the Mitigation Site Watersheds proposed acreage because the difference in acreage represents the proposed wetland mitigation areas which they claim “are considered sediment retention and nutrient assimilation treatment areas and are not included as a component of the contributing drainage areas.” This assumption is invalid because it was not consistently applied to the Cohoke Creek watershed where pollutant loading and retention/assimilation rates were applied to both the existing Cohoke Creek wetlands and the proposed King William Reservoir. Also, following Malcolm Pirnie’s logic, any changes in retention/assimilation of pollutant loads could just be due to removing this acreage from the assessment. For consistency, the District added 749 acres to the proposed Mitigation Site Watersheds acreage and assigned the respective wetland loading/assimilation efficiencies (see discussion below for results).

Malcolm Pirnie also assumed “Sediment and nutrient assimilation efficiencies for existing mitigation site conditions are assumed negligible, because these areas are predominantly agricultural fields and disturbed sites (mined sites)...net export systems.” Again this is an invalid assumption since the net export nature of these cover types is already factored into the assessment by the changes in cover type acreage (existing vs. proposed) and in the different estimated loading rates for each cover type. Additionally, Malcolm Pirnie’s assessment only incorporates sediment retention and nutrient assimilation efficiencies for wetland and reservoir cover types, and does not provide individual retention/assimilation rates for any other cover type (e.g., forestland, early successional logged areas, or agricultural fields). Therefore, the assessment calculates any overall retention/assimilation efficiencies for a watershed using the assumption that stormwater runoff from the catchments would funnel through either wetlands or open water (reservoir) before ultimately reaching the Chesapeake Bay. Considering the fact that all the proposed wetland mitigation sites ultimately drain downslope to existing natural wetland systems, the District reran the assessment using wetland retention/assimilation rates for the cover type acreages of the proposed Mitigation Site Watersheds. Other problems with the assumptions used in the assessment are addressed in the appropriate sections that follow.

Nutrient Assimilation: The nutrient assessment focused on nitrogen and phosphorus due to their importance in regulating the water quality of saline and non-saline aquatic environments, respectively, as discussed in the papers entitled “Nonpoint Source Pollution of Surface Waters With Phosphorus and Nitrogen” by Carpenter *et al.* in 1989 and “Nutrient Pollution of Coastal Rivers, Bays and Seas” by Howarth *et al.* in 2000.

In addition to the problems with the assumptions of Malcolm Pirnie’s assessment described above, the project proponents try to claim nitrogen and phosphorus treatment of the Mattaponi pumpover volumes as a net benefit of the project to the Chesapeake Bay. The pumpover should be viewed as an additional impact resulting from the project because it would elevate nitrogen and phosphorus loading rates to the proposed reservoir pool area and potentially to downstream reaches of Cohoke Creek. Using Malcolm Pirnie’s numbers, the pumpover alone would increase nitrogen loading by 4,500 lbs/year and would increase phosphorus loading rates to Cohoke Creek by 10,200 lbs/year above the current loading levels

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within the proposed reservoir pool area, and potentially to downstream reaches of Cohoke Creek. Since the proposed King William Reservoir is not a terminal reservoir, to better quantify treatment efficiencies of the pumpover by the reservoir and potential effects to downstream areas the project proponents would have to factor in the respective volumes of the pumpover that would enter the waterworks distribution system, the residence time of pumpover volumes staying within the King William Reservoir, and volume and nutrient concentrations of pumpover to be released to downstream portions of Cohoke Creek. Additionally, the applicant only followed the proposed pumpover to the proposed reservoir pool area, but to assess the impact of the project on water quality in the Chesapeake Bay the study would have to track this water through the waterworks system and intended use, ending with effluent discharge from the Hampton Roads Sanitation District. For these reasons, the Mattaponi pumpover should not be included in the nutrient assessment.

Malcolm Pirnie made some miscalculations that resulted in an overestimation of the nitrogen retention rate of the existing wetlands within the Cohoke Creek Watershed, an underestimation of the phosphorus retention rate of the existing wetlands within the Cohoke Creek Watershed, and an overestimation of the nitrogen retention rate of the proposed wetland mitigation sites within the Mitigation Sites Watershed. Using corrected figures the District recalculated the assessment to get an idea of general nutrient budget trends. Based on these modifications, the proposed King William Reservoir and mitigation sites would result in net assimilation of 11,826 pounds of nitrogen per year and 48 pounds of phosphorus per year in excess of that assimilated by the existing Cohoke Creek wetlands and unimproved mitigation sites. The majority of the reduction in pollutant loading would come from taking existing cropland and logged areas out of production for new use as potential wetland compensation sites. Although this assessment predicts there would be a net reduction in nutrient loading with the King William Reservoir project, by ignoring existing barriers to flow (e.g., Cohoke Millpond, BMPs, etc.) the assessment cannot accurately quantify existing levels of nutrient inputs to the Pamunkey River or Chesapeake Bay. Considering this assessment's level of resolution, it is difficult to conclude the project would result in an overall reduction in phosphorus inputs to the York River watershed. (A more detailed explanation can be found in the Functional Assessments Section of the Norfolk District's report entitled "Analysis of wetland and habitat impacts and the Regional Raw Water Study Group's proposed compensation for the proposed King William Reservoir.")

What is evident from the assessment is that both nitrogen and phosphorus inputs to the proposed reservoir pool area (and potentially downstream portions of Cohoke Creek) will significantly increase due to construction of the proposed King William Reservoir and introduction of pumpover from the Mattaponi River. No amount of offsite mitigation will alleviate this increase in nutrient loading within Cohoke Creek proper, with a net result being that downstream reaches of Cohoke Creek (at least to and including Cohoke Millpond) would potentially be impacted by elevated nutrient inputs.

Sediment Retention: Sediment dynamics are important not only for tracking erosion/deposition patterns within the landscape, but also as an aid in assessing the fate of adsorbed pollutants (e.g., phosphorus) and overall water quality (e.g., turbidity).

The problems with Malcolm Pirnie's assumptions described above apply to both the nutrient and sediment assessments. However, an additional error was made that is specific to the sediment retention analysis. The entirety of the existing Mitigation Site Watersheds should not be assumed to lack all sediment retention value. Since all mitigation sites ultimately drain to existing natural wetlands, the sediment retention value for the existing (unimproved) wetland mitigation sites is estimated to be 396

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tons/year (566 tons/year sediment loading rate for all existing cover types in the Mitigation Site Watersheds with a wetland sediment retention rate of 70%).

While still acknowledging the shortcomings of the study assumptions, the District recalculated the assessment using the changes described above to get an idea of general sediment budget trends. Based on these modifications, the proposed King William Reservoir would retain approximately 85 tons of sediment per year more than that currently retained by the existing Cohoke Creek wetlands, and the proposed wetland compensation sites would result in added retention of approximately 106 tons of sediment per year. Although the existing Cohoke Creek wetlands undeniably perform important sediment retention functions, sediment is still naturally transported downstream. This downstream transport of sediment is not only normal, but is essential for the natural maintenance of a healthy riverine system as described in Fluvial Processes in Geomorphology by Leopold, *et al.* in 1964; and in the paper entitled “Downstream Ecological Effects of Dams” by Ligon, *et al.* in 1995, as well as Restoration of Aquatic Ecosystems by the National Research Council in 1992. The extent and structure of the existing downstream Cohoke Creek wetlands reflect the natural balance of erosion and sediment deposition rates that have resulted from the existing character of the catchment (e.g., land use). Malcolm Pirnie predicts that the King William Reservoir dam would increase sediment storage in the upper Cohoke Creek watershed, which by default would have to result in deprivation of sediment to downstream wetlands and riverine habitat. Such sediment deprivation could result in changes in channel patterns (e.g., loss of braided channels), changes to channel dimensions, reduction in sediment deposition rates that maintain downstream floodplain and riparian habitats (including vegetated wetlands), changes in nutrient dynamics, etc. This alteration of sediment dynamics in Cohoke Creek should be viewed as an environmental impact rather than a project benefit. This viewpoint is consistent with the detrimental effects of the existing Cohoke Millpond as viewed by Malcolm Pirnie in the Mitigation Program, Fish and Wildlife Mitigation Plan and the City of Newport News (letter dated 27 November 2000 to address comments from the EPA).

It does seem reasonable to expect improved sediment retention from taking existing cropland out of production for use as wetland mitigation sites, but due to the limitations of this assessment, the magnitude of the predicted sediment retention improvement outside of the Cohoke Creek watershed is unknown. By taking active cropland out of production, the establishment of the proposed wetland mitigation sites would likely result in benefits to the aquatic environment by reducing nutrient levels and sediment loads. However, the proposed project would result in alterations to the nutrient and sediment dynamics within Cohoke Creek, which cannot be compensated by the proposed mitigation plan. Nitrogen and phosphorus levels would be elevated within the proposed pool area and potentially to downstream reaches of Cohoke Creek. The proposed dam would result in excessive sediment retention that over the long-term would detrimentally impact portions of Cohoke Creek, at least downstream to the Cohoke Millpond.

Comments Received on the RROD Regarding Sediment Retention/Nutrient Assimilation: The City of Newport News claims that the methodology used to assess sediment and nutrient assimilation were conducted at the recommendation and with the oversight of the EPA. Sediment and nutrient assimilation assessments were briefly mentioned at an interagency meeting and EPA offered to provide references if needed, but the specific assumptions for such assessments were never discussed at an interagency meeting or provided to the District. The District has since learned that EPA did provide informal input on the assessment (EPA personal communication, 14 June 2001), and the Final RROD has been revised to reflect this change. Regardless, the assumptions and limitations of these assessments were never

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discussed with the District, and I maintain my position as provided in the RROD (Section (v.), pages 81 to 84) and as clarified below.

The District acknowledges that some sediment and nutrient assimilation benefits would be realized soon after construction of the project due to the retention in the reservoir pool area and removing the mitigation sites from agricultural production. However, the temporal losses associated with early successional stages of the proposed wetland mitigation sites should have been considered rather than assuming the mitigation sites would be fully functional from the start of the project. The City of Newport News claims that the Norfolk District is taking issue with the fact that they did not include the State's water quality control strategy for the York River in their assessment. The City has misunderstood the District's position. I believe that the assessment should not have completely ignored any existing cropland/forestry/mining BMPs within the Cohoke Creek project area or at the proposed wetland mitigation sites.

The City of Newport News claims that it was appropriate to exclude existing mitigation sites from the sedimentation calculations. The District considers this assumption invalid because the net export nature of these cover types is already factored into the assessment by the changes in cover type acreage (existing vs. proposed) and in the different estimated loading rates for each cover type, and the assessment only incorporates sediment retention and nutrient assimilation efficiencies for wetland and reservoir cover types, and does not provide individual retention/assimilation rates for any other cover type (e.g., forestland, early successional logged areas, or agricultural fields). The RRWSG's assessment model is not designed in a manner to accommodate their assumption.

The City of Newport News stated that sedimentation from the surrounding activities in the Cohoke Creek watershed and further into the Chesapeake Bay system is perhaps the leading impairment to these systems. They and the DEQ further claim that any sediment retention that can be provided to these systems should be viewed as a benefit. The District recognizes that too much sediment can lead to impairment of a waterway; however, the proposed King William Reservoir dam would adversely affect the existing balance of sediment transport within the sparsely developed Cohoke Creek watershed. The proposed project would result in the trapping of all sediment transport above the King William Reservoir dam site, which would negatively impact downstream reaches of Cohoke Creek at least to the Cohoke Millpond which the RRWSG identifies as a barrier for sediment and nutrient transport to the Pamunkey and York Rivers, except for during storm events. As discussed in the RROD (page 84), this alteration to sediment dynamics within the Cohoke Creek watershed should be viewed as an environmental impact that affects wetlands in addition to the 403 acres of vegetated wetlands within the proposed reservoir pool area.

The RROD states that the RRWSG should not claim nutrient assimilation benefits to the Chesapeake Bay from the Mattaponi River pumpover water in the reservoir since they did not track this water through the HRSD system and other ultimate users. The City of Newport News claims that it is completely proper to include the assimilation benefits in the calculations because the river water will be transferred to the reservoir, pumped to the service area for use, treated at wastewater treatment systems and returned to the Bay ecosystem by wastewater treatment plants that have discharge limits which require them to remove excess nutrients before discharging to the Bay. This is an oversimplification of the system since a percentage of the water pumped to the service area will likely be put to uses that are not collected by the HRSD system and can contribute to non-point source pollution (e.g., watering lawns, washing cars, etc.).

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These likely uses were not considered in the overly simplified nutrient assessment model developed by the RRWSG.

The City of Newport News maintains that there were no miscalculations in their nutrient assimilation model as stated in the RROD on page 83. Despite their claims to the contrary, as discussed in U.S. Army Corps of Engineers (2001d), the RRWSG made the following three miscalculations:

1. Overestimated the N retention rate of the existing wetlands within the Cohoke Creek Watershed to be 2,117 lbs./year when it should be 1,785 lbs./year.
2. Underestimated the P retention rate of the existing wetlands within the Cohoke Creek Watershed to be 81 lbs./year when it should be 149 lbs./year.
3. Overestimated the N retention rate of the proposed wetland mitigation sites within the Mitigation Sites Watershed to be 17,432 lbs./year when it should be 9,173 lbs./year.

The City of Newport News commented that the District went on to recalculate the nutrient retention function with its own assumptions, and still reached the same conclusions as the RRWSG that the project, with mitigation, would provide a net gain in P and N retention. The RROD acknowledges this, but cautions that considering the simplified nature of the assessment and low resolution of the model, that “it is difficult to conclude that the project would result in an overall reduction in phosphorus inputs to the York River watershed.” (District recalculations estimate the project, including all proposed mitigation sites, would result in a net phosphorus retention of 48 lbs/year.) The applicant further commented that there is no evidence that the pumpover would increase nutrient export from the reservoir to downstream portions of Cohoke Creek. Although the water pumped into the reservoir would have significantly higher nutrient concentrations than the natural waters of Cohoke Creek, the RRWSG claims it would be withdrawn as a water source. This is somewhat contrary to other comments that the City of Newport News has provided on the RROD in regard to the VWPP permit conditions and downstream releases. For example, the City stated “...most of the time, King William Reservoir would be full and thus would release more than median monthly flows during high flow periods when spills due to high natural basin runoff exceed State-mandated median monthly flow releases.” They also stated “Consequently, there would be a significant portion of time in which King William Reservoir spills would exceed the required downstream releases.” Additionally, Newport News stated “The Norfolk District ignores that State-mandated median monthly flow releases from King William Reservoir would substantially exceed natural Cohoke Creek flow levels that would otherwise occur during drought conditions. For example, it is estimated that Cohoke Creek flows at dam site KWR-IV would have averaged 1.1 mgd over the six-month period June 1981 through November 1981. In comparison, the State-permitted release schedule would average 2.2 mgd over these six months, or 100 percent more than would have naturally occurred in a drought without the reservoir.” Considering the information discussed in the RROD and these other comments provided by the City of Newport News, I believe there is a high likelihood that the proposed Mattaponi River pumpover to the proposed King William Reservoir would result in elevated nitrogen and phosphorus loading to downstream portions of Cohoke Creek. This is considered to be a detrimental impact to wetlands other than the 403 acres of vegetated wetlands that are proposed to be directly displaced by the King William Reservoir proper.

(vi.) Floodflow Alteration: In 1996 the project proponents, without the benefit of input/concurrence on assumptions from the Norfolk District or any advisory agencies, performed an

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analysis to predict the change in floodflow alteration in the Cohoke Creek watershed if the King William Reservoir were constructed. This study was largely based on extrapolations from published data and assumptions made by the project proponents.

Although the RRWSG says the proposed King William Reservoir releases would mimic the natural Cohoke Creek flows, in the Environmental Issues Summary, they claim the King William Reservoir will prevent downstream flooding by providing ten times greater flood detention functions than that currently performed by the existing Cohoke Creek wetlands. It should be remembered that flood events, especially in such a sparsely developed watershed like Cohoke Creek, are natural and not only contribute to channel formation and maintenance of riverine systems but also are important in nutrient cycling dynamics, as discussed in Restoration of Aquatic Ecosystems by the National Research Council in 1992 and in the paper entitled "Nature's Pulsing Paradigm" by Odum *et al.* in 1995. By reducing the frequency and duration of flood flows, the proposed King William Reservoir would likely result in additional impacts to downstream portions of Cohoke Creek. Construction of the King William Reservoir might maximize one or a few wetland functions, but overall it appears the project would sacrifice other wetland functions and likely be an overall detriment to the Cohoke Creek watershed. The National Research Council states, "The construction of dams and dredging of river, stream, and the coastal waterways eliminate wetlands at the project site and also affect downstream systems. The stabilization of water levels for rivers or lakes eliminates the vital pulsing function that flooding provides, thus interrupting nutrient and sediment delivery...the natural maintenance and expansion of wetlands often depend on sedimentation events, which are interrupted by dams (long term reduction in sediment load)."

(vii.) Landscape Interspersion/Connectivity: This function considers both terrestrial and aquatic habitats and their relationship to one another, but was only superficially addressed in the RRWSG's Mitigation, Program, Fish and Wildlife Mitigation Plan. It is an important function to consider because it attempts to compare the existing Cohoke Creek system with the proposed King William Reservoir from a landscape perspective.

The RRWSG's assessment mainly discussed how periodic logging in the project area has resulted in a fragmented landscape. It seems reasonable to suspect the King William Reservoir proposal precipitated the accelerated logging at the study site, especially by current property owners of the proposed reservoir pool area. Silvicultural activities are common not only in the project area, but also throughout Virginia and across the country. Although logging operations often do fragment large forested blocks, in comparison to the RRWSG's proposal to backflood a large portion of the Cohoke Creek upper watershed, the influence of logging can be viewed as a relatively temporary impact. Silvicultural activities can and do alter sediment deposition rates, wildlife habitat, TNPP rates, and nutrient cycling; however, they rarely sever such connections as would construction of a dam.

The proposed King William Reservoir would result in the replacement of a diverse wetland-upland complex that spans a continuum from extreme headwaters to higher order stream, with a fairly monotypic open water habitat. Stanford and Ward in Ecology of Regulated Streams emphasize the interconnectivity of a river to its catchment by describing a river as "an expression of the valley through which it flows; production of carbon in lotic habitats is greatly influenced by input of allochthonous nutrients and detritus from the drainage basin."

The project would not only result in a change in wildlife habitat within the proposed King William Reservoir pool area, but would also result in impacts to downstream portions of the Cohoke Creek system

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at least to and including the existing Cohoke Millpond (see Section 8 f. (2) (d) for Total Net Primary Productivity, Sediment Retention/Nutrient Assimilation, and Floodflow Alteration). This viewpoint is based on the same reasoning applied by the RRWSG to the existing Cohoke Millpond when they stated the millpond dam prevents “the aquatic productivity of upstream [Cohoke Creek] wetlands from being available to the downstream tidal Pamunkey River system” in the Mitigation Program, Fish and Wildlife Mitigation Plan. In the letter from Newport News dated 27 November 2000 responding to EPA’s comments on the Environmental Issues Summary, this same viewpoint was reiterated as “Cohoke Millpond Dam also blocks nutrient and sediment export to the York River Ecosystem and has, therefore, altered the hydrology of Cohoke Creek”; and “sediment and nutrient transport to the Cohoke Tidal Estuary have been cut off for more than a century by an existing dam and impoundment located 3.5 miles downstream of the proposed dam site.” In this same letter, the City of Newport News suggested all the wetland acreage located downstream of the Buckhorn Reservoir in North Carolina could be affected by altered flows resulting from construction of the dam. The World Commission on Dams in a 2000 publication entitled Dams and Development: A New Framework for Decision-making forwards the opinion that more than one dam on a single river could “affect both the physical (first-order) variables such as flow regime and water quality, and the productivity and species composition of different rivers. The problems may be magnified as more large dams are added to a river system, resulting in an increased cumulative loss of natural resources, habitat quality, environmental sustainability and ecosystem integrity.”

In the Mitigation Program, Fish and Wildlife Plan, the RRWSG claims that the proposed wetland mitigation sites would re-establish connections to existing wetlands and riparian corridors, and that these would be preserved in perpetuity. Although the preservation of the mitigation sites and associated buffers in perpetuity has merit in retaining landscape connections over the long term, the diversity of created/restored wetlands is low and out-of-kind with those at Cohoke Creek. The majority of the proposed wetland compensation sites are designed to be depressional wetlands with one or more water control structures (water conveyance channels).

(viii.) Uniqueness: The letter from the City of Newport News dated 27 November 2000 in response to EPA’s comments on the Environmental Issues Summary refers to the Cohoke Creek wetlands as not being unique in any way, and not even being a good example of a Coastal Plain forested riparian system. This is contrary to the RRWSG’s own WET study that documented “the King William AA [Assessment Area] received a high ranking [in Uniqueness/Heritage] due to it representing most or all of this wetland system type within the watershed and due to the AA being located in a pristine area.” The RRWSG’s reptile and amphibian study by Mitchell in 1994 states “The lack of rare species in the Cohoke Mill Creek watershed does not mean that the area is unimportant herpetologically. On the contrary, this system of wetlands harbors a rich diversity of amphibians and reptiles. The relatively pristine nature of the wetlands in and associated with the creek insures that numerous species requiring water for some part of their life cycle will occur there. The list of species...demonstrates that the fauna is healthy.” In a letter dated 23 August 1996, the Service noted “wetland habitats our sampling team found the most impressive were often the most inaccessible. The true ecological diversity of the site cannot be experienced from the few road crossings or easy access roads used by the Service for our initial review of the Cohoke Creek site....sampling team observed an extremely diverse array of macroinvertebrates in the wetland complex. The Cohoke Creek reservoir site is a unique resource within Virginia’s Lower Peninsula.” District staff spent quite a bit of time in the Cohoke Creek valley verifying the cover type mapping and collecting data for the HEP analysis. District staff strongly disagrees with the RRWSG’s current interpretation that the existing study area does not represent a good example of a Coastal Plain forested riparian system.

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As discussed above, the accelerated logging in the project area was likely due, in part, to the King William Reservoir proposal. Private owners of land within the proposed pool area would understandably be interested in harvesting the timber that otherwise would be lost due to backflooding if the project was ever authorized. Regardless, from a long-term perspective this is a relatively temporary impact. The mature Cohoke Creek system that existed prior to this last round of logging had not been a virgin forest stand, but rather was a stand that regenerated from a previous harvest.

Regarding the EPW and WET uniqueness variable, the project area wetlands are unique in that they represent the bulk of the upper headwaters of Cohoke Creek. The majority of the functional assessments for the project have demonstrated that these wetlands provide services to the Cohoke watershed that cannot be replaced either by the proposed King William Reservoir or the proposed offsite compensation.

(ix.) Summary of Functional Assessments: The minutes of the 2 August 1995 wetland mitigation workshop recorded by the RRWSG note that the District emphasized “assessment of [wetland] functional value must go beyond the boundaries of the wetlands; likewise, the mitigation program needs to go beyond wetlands.” According to the 1990 MOA between the Corps and EPA, the primary goal of wetland mitigation is a minimum of 1 to 1 functional replacement of lost wetland functions. The 2 to 1 wetland acreage compensation goal was identified early on as a interim goal to be used since the HEP and wetland mitigation teams were working concurrently. The RRWSG has been well aware of the primary wetland compensation goal throughout the evaluation of the King William Reservoir project, but has continued to focus on the interim ratio of 2 to 1 wetland replacement even after the functional assessments demonstrated that there would be a net loss of wetland functions.

A review of the functional assessment methods shows that the overall King William Reservoir project (proposed reservoir and mitigation sites) would not fully compensate for lost wetland functions, but rather would result in a net loss of wetland functions (e.g., wildlife habitat, total net primary productivity and support to the downstream wetlands as related to floodflow alteration, nutrient assimilation, sediment retention, etc.). Based on flawed assumptions, the WET analysis was only performed on the Cohoke Creek wetlands in the proposed King William Reservoir pool area, and was not used to evaluate the reservoir or proposed wetland compensation sites. The WET was originally performed for use in making broad-brush comparisons of different reservoir alternatives, but the RRWSG has since sought to interpret the WET results well beyond the assumptions of the original assessment. The EPW assessment, also based on flawed assumptions, was only successful in emphasizing the fact that the Cohoke Creek wetlands and the proposed wetland compensation sites belong to different wetland classes and hence provide different wetland functions. The HEP study clearly demonstrated that the overall King William Reservoir project would not provide full in-kind compensation for either wetland or upland habitat losses in the King William Reservoir project area. Again, this highlights how the overall King William Reservoir project fails to address the functional loss of a diverse, self-sustaining riverine wetland system. The TNPP study, although based on some erroneous assumptions, demonstrates the overall King William Reservoir project would result in a net reduction of TNPP both within the proposed King William Reservoir pool area as well as downstream reaches of Cohoke Creek. The Sediment Retention and Nutrient Assimilation desktop reviews simply predict that a few wetland functions could be maximized with construction of the King William Reservoir, but to the overall detriment of the remaining Cohoke Creek system by eliminating other important functions (i. e., King William Reservoir would sever TNPP, nutrient, and sediment connections between the headwaters and downstream reaches of Cohoke Creek). Replacing a heterogeneous wetland/upland riverine system complex with a large homogenous impoundment would undoubtedly result in a reduction of Landscape Interspersion/Connectivity functions.

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(A more detailed discussion of the various functional assessments can be found in the Functional Assessments Section of the Norfolk District's report entitled "Analysis of wetland and habitat impacts and the Regional Raw Water Study Group's proposed compensation for the proposed King William Reservoir.")

(e) Applicant's Compensation Proposals:

(i.) Mitigation: The Council on Environmental Quality has defined mitigation in its regulations at 40 CFR 1508.20 to include: avoiding impacts, minimizing impacts, rectifying impacts, reducing impacts over time, and compensating for impacts. In regard to wetland mitigation, the 1990 Corps/EPA Mitigation MOA requires a sequential review whereby project proponents must first demonstrate avoidance of wetland impacts, then steps taken to minimize wetland impacts, and finally how unavoidable wetland impacts will be compensated. While compensatory mitigation for wetland losses must be planned and considered in the evaluation of a permit application, even complete wetland compensation would not override the sequencing process in determining whether a project would not be contrary to the public interest. If there is no demonstrated need for the loss, then the loss is avoidable and no amount of wetland mitigation can compensate for the loss. Wetland losses must first be avoided, then minimized and finally unavoidable wetland losses must be mitigated. The District's assessment focuses on compensatory mitigation for anticipated wetland impacts that would result from construction of the proposed King William Reservoir. The May 1999 Final Wetland Mitigation Plan indicates that the King William Reservoir project was selected by the RRWSG as the least damaging, practicable alternative. The RRWSG claims this choice was based on the process of the Environmental Protection Agency's 404 (b)(1) Guidelines. However, only the Corps makes the decision as to what constitutes the least environmentally damaging, practicable alternative at the end of the permit evaluation. The applicant cannot make that determination. Avoidance and minimization need to be demonstrated first; however, the applicant's compensation proposals needed to be reviewed by the District so a determination could be made as to whether the compensation proposals could offset the losses. Evaluation of steps taken to avoid and minimize wetland impacts are addressed elsewhere in this document.

(ii.) Mitigation Team: An interagency team was formed in 1997 to evaluate and provide guidance on a wetland mitigation plan to be developed by the RRWSG to compensate for the proposed wetland impacts that would result from the construction of the King William Reservoir. The team was comprised of representatives of the Norfolk District, EPA, the U. S. Fish and Wildlife Service, Christopher Newport University (under contract with the EPA), Virginia Department of Environmental Quality - Water Division, Newport News Waterworks, and Malcolm Pirnie, Inc. In a letter dated 3 September 1998, the City of Newport News notified the District that they had retained Southern Tier Consulting and Environmental Specialties Group to assist them with the mitigation effort, and that Environmental Specialties Group would replace Malcolm Pirnie as the leader of their mitigation team.

The interagency mitigation team was assembled to review possible compensatory mitigation strategies in conjunction with reviewing other facets of the proposed reservoir project. As part of the review process, the RRWSG needed to show they could find 806 acres of compensatory wetland mitigation. Because finding 806 acres of compensatory mitigation is not an easy task, the team worked to review the sites to determine if they were feasible for wetland creation. Some sites were preliminarily reviewed and found not to be acceptable. Other sites have been studied in more detail and the information has been provided in the "King William Reservoir Project Final Wetland Mitigation Plan" dated May 1999, by the RRWSG.

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Generally, the Corps prefers onsite compensation sites. However, onsite restoration and creation areas were not available due to steep topography, high elevations, and the lack of available prior converted (PC) farmlands. Therefore, the consultants looked offsite using a screening process for identifying potential mitigation sites. The consultants reviewed sites which contained the following: large acreage for potential wetland development, hydric soils, sources of hydrology, proximity to existing wetlands and streams, suitable landscape position, and site access. In general, priority was to be given to potential wetland restoration (e.g., prior converted cropland) rather than wetland creation sites, which may require extensive site manipulation. The Mitigation Team tried to ensure that creation was not forced onto a marginal site. Also, an effort was made to evaluate the sites so as not to maximize wetland restoration/creation acreage past that which the landscape position of the specific site could support. The mitigation effort for this stage of the project was mainly driven by the acreage goal to meet the 2 to 1 ratio requirement and to match cover type and hydrologic regime.

(iii.) August 1996 Conceptual Mitigation Plan: A Conceptual Mitigation Plan was developed solely by the project proponents without interagency input and submitted to the District for review in August 1996. This document contained the assumptions and findings of the Evaluation of Planned Wetlands (EPW) functional assessment, which was not accepted by the District or other agencies (see Functional Assessments, above). The report was prepared largely to provide the Virginia Department of Environmental Quality with a conceptual mitigation plan for their permit review process. The plan was developed prior to the formation of the Mitigation Team and proposed 590 acres of compensation on sites which had not been reviewed by the District and the agencies. The plan identified 12 sites, 7 of which are still proposed as primary mitigation sites in the final mitigation plan.

Early on, the RRWSG claimed that their unfinished plan met the 2 to 1 replacement goal and could fully compensate for the losses of the large wetland system in the Cohoke Valley. The August 1996 Plan states, "This plan is generous and demonstrates that the project's wetland impacts will be more than offset by compensatory mitigation projects." However, the 1996 plan had not been determined to meet the required goal of 2 to 1 replacement of lost acreage, because the RRWSG had not yet even identified 510 acres of the compensation plan for review by the District or the agencies.

(iv.) Pilot Study: The concept of a Pilot Study was formulated in a 17 April 1997 Mitigation Team meeting to demonstrate the level of design detail needed for each of the wetland mitigation sites. The Pilot Study produced detailed water budget information for Meadow Farm Site C; however, the agencies were still concerned about suitable hydrology for that site and others. To remedy these concerns, the Mitigation Team came to a consensus agreement that if the project were permitted, a few of the more questionable and problematic mitigation sites would be constructed prior to any work being conducted in wetlands at the impact site. Up-front construction of these wetland mitigation sites would help test the validity of the water budgets and other assumptions made in the mitigation plans.

(v.) October 1997 Draft Mitigation Plan: The RRWSG submitted a Draft Mitigation Plan in October 1997. This plan was the applicant's first version of a compensation plan with interagency input. However, the RRWSG prematurely released the October 1997 Plan to the public with claims of full in-kind replacement. During a 13 November 1997 Mitigation Team meeting, the District staff informed the RRWSG that they should not claim to fully compensate for all the impacts if they could not substantiate such a claim. In a 24 November 1997 letter to the RRWSG, the District reiterated that the October 1997 Plan did not meet the goal of "no net loss" of wetlands. The Plan was incomplete and could not claim full in-kind functional replacement, since the HEP study and other assessment methods were not finished.

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The District recommended the RRWSG withdraw the report and resubmit it when the HEP and mitigation reviews were complete. The RRWSG agreed to continue to work with the Mitigation Team and submit a complete report at a later date.

During an 8 December 1997 meeting of the District and the advisory agencies, a consensus was reached concerning the primary goal of the mitigation plan and the use of the HEP study. The wetland mitigation plan should strive to replace other wetland functions that would be lost in addition to wildlife habitat losses. The mitigation scenarios, that would be used to replace the habitat units lost, would be evaluated by the mitigation team to determine which scenarios could provide the most beneficial wetland functions. In a letter dated 28 May 1998, EPA concurred with the Service's approach of maintaining the 2 to 1 ratio of wetland replacement while using the HEP as a guide to design feasible wetland sites.

(vi.) Fringe Study: The Fringe Study was completed by the RRWSG in an attempt to justify the use of potential fringe area around the reservoir as wetland mitigation. The project proponents performed this study without the benefit of input or concurrence on assumptions by the District or any advisory agencies. This study attempted to examine the abiotic factors that influence the development of potential fringe wetlands based on evaluation of several existing "reference reservoirs" in the Hampton Roads area during the summer of 1996. Using this information, Malcolm Pirnie extrapolated the expected extent of fringe wetland development at the proposed King William Reservoir at future time intervals. During a 28 August 1997 Mitigation Team meeting and in a 29 September 1997 memo, the District provided detailed comments on the Fringe Study; however, these comments were not addressed in the RRWSG's final version of the study that was circulated in October, 1997. Since the concerns of the District and other agencies were not adequately addressed, the assumptions and findings of the Fringe Study have been rejected. The HEP team gave suitable habitat credit to the proposed King William Reservoir lakeshore with its bordering vegetated buffer and unvegetated shallow water areas.

The District's problems with the use of the projected wetland fringe acreage as wetland compensation stem from the difficulty in quantifying the amount of wetland fringe that would potentially develop, the long-term sustainability of the fringe, and the fact that any fringe wetland development would be out-of-kind. The report draws conclusions on wetland succession based on field observations of existing reservoirs of different age classes made during a single growing season. However, the report did not distinguish field observations of persistent wetland communities that were present before construction of the reservoirs from wetland communities newly established after the reservoirs were constructed. This may lead to erroneous predictions on wetland fringe succession, particularly as it relates to the predicted depths that the different wetland classes may colonize over time. This is especially applicable to the proposed King William Reservoir, which would result in the loss of virtually all wetlands located upstream of the proposed dam.

The Service commented on the use of the fringe to provide some habitat benefit that could be evaluated using HEP, but indicated that the predicted acreage provided in the Fringe Study did not appear to be justified. The Service was opposed to using the potentially developing fringe area as compensation for wetland impacts, but agreed to using the fringe for habitat compensation. Also, in their August 1997 memo, EPA stated "incidental fringe development will not be accepted by EPA as wetland compensation for wetland losses incurred as the result of inundation. The unpredictability of wetland development, coupled with the frequency and duration of drawdowns at the reservoir will not provide assurance of success."

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(vii.) July 1998 Draft Mitigation Plan: The concept of the RRWSG submitting a working document was discussed during the 27 and 28 May 1998 Mitigation Team meetings. During the meeting the link between the HEP Study and the mitigation plan was again discussed. The District and the agencies highly encouraged the RRWSG to finalize the HEP prior to submitting a mitigation plan. The Mitigation Team met on 26 June 1998 and discussed the need for in-kind replacement of the wetlands that would be lost and the problem of replacing the riverine wetlands with depressional wetlands that may not be as productive. The Team also listed the functions of the existing wetlands and commented on the loss of riverine systems. The projected total acreage for the proposed sites was also examined.

The RRWSG submitted a Working Draft Mitigation Plan in July 1998 to the District and the agencies. The plan was submitted as a working document; otherwise it would have been sent to the agencies for official comment. The District staff and the agencies felt that almost all of the potential wetland mitigation acreage for each site had been overestimated. Overall, the proposal in the July 1998 plan fell short of the 2 to 1 goal by over 200 acres. Contingency measures included use of sites that had not been approved. In addition, the plan proposed that "If some, or portions of some of the proposed 785 acres of wetland restoration and creation are not feasible following final design, fringe wetlands will make up any differences to provide the 2:1 acreage." The District and the agencies had previously indicated several times that the potential fringe development could not be used as wetland compensation.

The plan also offered a proposal for preservation of existing marshes to meet the 2 to 1 compensation goal. While the District and the agencies agreed the proposed preservation areas contained pristine marshes, the use of preservation to compensate for the proposed losses in the Cohoke system was not acceptable. In addition, the Virginia Department of Environmental Quality's permit specified a mitigation compensation package of no less than 2 to 1 creation/restoration. Therefore, the state permit would have to be modified if a significantly different mitigation scenario was utilized.

In the 1998 plan, like others, the RRWSG claimed that the mitigation plan, "when successfully implemented, will fully compensate for wetland losses that would result from the proposed King William Reservoir." Due to many concerns with the proposed sites and the estimated acreages, the plan was deemed by the District staff to be incomplete.

(viii.) February 1999 Final Revised Draft Mitigation Plan: In February 1999, Environmental Specialties Group submitted the Final Revised Draft Mitigation Plan on behalf of the RRWSG. In this plan, the RRWSG claimed there would be no net loss of wetland function and value, and they stated there would be a net environmental gain as a result of implementing the strategies they had outlined. However, the functional assessments did not support these claims.

The February 1999 Plan was the first time sites outside of the immediate watershed had been added to the mitigation plan. Because the RRWSG indicated that they had exhausted all opportunities in the York River Watershed, the RRWSG set their focus on the Rappahannock Watershed to find additional acreage. EPA questioned whether the RRWSG had exhausted all options in the York River Watershed because the RRWSG discussed acquiring mitigation sites via condemnation. In their February 1999 memo to the District, EPA was "concerned that the February 1999 Plan makes reference to the fact that the City of Newport News has made the determination that it is willing to consider condemnation to acquire beneficial mitigation sites. If this is true, it raises the question of allowing the RRWSG to move outside the watershed of the York River Basin to investigate mitigation sites. EPA predicated the decision to move outside the watershed for mitigation on the fact that Newport News had exhausted all feasible sites

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within the York basin and would not pursue condemnation of property to acquire sites for mitigation. This is an important issue and one that needs to be discussed before EPA considers the additional sites included in the February 1999 Plan as feasible.”

In the February 1999 memo, EPA also expressed concerns about the mitigation process. The Mitigation Team had a systematic approach to reviewing the proposed sites and the process had been disrupted by a change in consulting firms. EPA was particularly distressed that “the February 1999 Plan, while including previously agreed upon sites and particular design elements, has included significant changes in compensation acreage without the appropriate data to support such changes.” The acreage of potential mitigation on half of the sites had been substantially increased without the District’s and the agencies’ agreement. The Mitigation Team had previously reached a consensus of the acreage figures for the proposed sites during a January 1998 meeting. EPA expressed their concern for providing “additional wetland acreage at existing sites by expanding the compensation beyond the footprint of hydric soils.” No additional documentation was offered by the RRWSG to support the changes. EPA stressed that the approach “may result in wetland development which would not be appropriate for the landscape or may result in failure to create wetlands at all.” Given their concerns about the February 1999 Mitigation Plan, EPA objected to the plan because it would not “provide the optimal means of mimicking the values and functions of the wetlands lost at Cohoke Mill Creek.”

(ix.) May 1999 King William Reservoir Project - Final Mitigation Plan: On 27 May 1999, the Final Wetland Mitigation Plan was submitted by Environmental Specialties Group with input from Malcolm Pirnie. Conceptual design plans were included in the May 1999 plan. The Final Plan focused on achieving needed acreage to meet 2 to 1 wetland replacement. However, it was recognized that the final acreage needed could increase depending on the results of the ongoing functional assessments.

In the Final Mitigation Plan, the RRWSG expressed their opinion that the acreage required could even be reduced below the 2 to 1 ratio and still meet the goal of no net loss of wetland function. They quote Kruczynski’s 1989 paper entitled “Mitigation and the Section 404 Program: A Perspective,” in which he indicates that ratios can be lowered where the mitigation is in place prior to the impacts. In that paper, Kruczynski clarifies that those ratios “are suggested for on-site, type-for-type (in-kind) replacement mitigation.” In addition, his suggestions were generally directed to wetland restoration. A large portion of many of the King William Mitigation sites would be considered creation. For wetland creation, he indicated that “Increasing the ratio to 2 to 1 can be justified on the basis of the greater risk associated with any particular site.” The Lanesville and Meadow Farm Site B both contain farmed wetlands. Typically, credit for enhancement would be given at even higher ratios, due to the fact that some wetland functions are currently present. Kruczynski notes that for enhancement “There is a risk that although some functions will be improved other currently existing functions could be degraded. Due to this uncertainty, a 3 to 1 mitigation should be required on an acre-for-acre basis.” The District does not agree that the proposed plan would exceed prescribed ratios and go far beyond achieving no net loss of functions and values as stated in the Final Mitigation Plan. I have determined that if all of the primary sites and some of the contingency sites are completely successful, the applicant’s Mitigation Plan would provide no net loss of acreage and some wetland functions, but has not been demonstrated to fully compensate for all functions of the existing Cohoke Creek system.

Comments from the Service and EPA came at the time when the need for the projected amount of water was being re-evaluated by the District based on the findings of reviews conducted by the Institute for Water Resources. In the Service’s 22 July 1999 letter and EPA’s 5 August 1999 letter to the District,

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both agencies conveyed their belief that the sequencing process of mitigation had not been completed due to the possibility of an existing less damaging alternative. EPA only provided general comments on the Final Mitigation Plan, and requested the opportunity to comment in more detail if in the future new information supported issuance of a permit for the reservoir as the least environmentally damaging practicable alternative. EPA stressed the importance of recognizing “the diverse wetland communities present may be extremely difficult, if not impossible, to adequately replace.” EPA also maintained their opinion that the Cohoke wetlands qualify as an Aquatic Resource of National Importance (ARNI) due to the diverse type, quantity and functional capacity. The basis for the determination is found in Part IV 3(a) of the Clean Water Act Section 404(q) Memorandum of Agreement between EPA and the Department of Army.

The Service also expressed concern for replacing a “stream valley wetland complex driven by a groundwater/surface interface” with farm fields that have depressional surface water regimes. The Service believes the proposed mitigation is hydrologically and ecologically “out-of-kind.” Even though the created wetlands would be of the same cover types according to the Cowardin classification as the existing wetlands, the Service indicated those areas would not have the same sources of hydrology which affect the functions of the system. The landscape positions of the proposed mitigation sites do not mimic that of the Cohoke Valley stream complex. The plan attempts to take pieces of land that are adjacent to streams and rivers and perch water to create wetlands or restore cropland back to its former wetland status. Most of the proposed mitigation sites would be predominantly precipitation driven with a few having unquantified groundwater inputs. The Cohoke Valley contains flow-through wetlands that absorb and export nutrients, retain and transport sediments, and retain floodwaters as they pass through the system and provide habitat to species that thrive in these slow moving stream valleys. The proposed sites may be adjacent to streams or have streams on the property, but the proposals do not restore stream valley complexes as claimed by Newport News in their 28 November 2000 letter.

In their 22 July 1999 letter, the Service expressed concerns over the sustainability of off-site hydrology for the mitigation sites. Previously, District staff raised the issue of sustaining long-term hydrology of some sites in comments dated 29 July 1997 in response to the Pilot Study. The District and the agencies were concerned about changes in land use over time, which could detrimentally influence the long-term hydrology supporting the mitigation sites. During Mitigation Team meetings, the possibility of the RRWSG obtaining hydrologic easements was discussed. The Service sees this as a serious deficiency in the Plan and has indicated they would object to a Final Wetland Mitigation Plan without a commitment from the RRWSG to obtain long-term hydrology rights from off-site sources for certain sites, such as the Townsend and Lanesville sites which heavily rely on surface water runoff as a major source of hydrology. Newport News responded to this issue in their 28 November 2000 letter to the District in which they address the comments on the Final Mitigation Plan. They have indicated their willingness to obtain water rights once the sites have been purchased. However, they feel that in some cases it may not be needed, because major portions of the drainage area are located on the mitigation sites or preservation sites. I agree that it may not be necessary to purchase water rights on all sites, but protection of the watershed would be imperative for the success of some of the sites that rely predominantly on surface water runoff.

Although the RRWSG’s Final Mitigation Plan proposed only a 5-year period for monitoring, in their 28 November 2000 letter responding to agency comments, the City of Newport News agreed to the recommended 20-year timeframe. Should a permit be issued, the District would work with the applicant to develop an acceptable monitoring plan with specific success criteria should discussions on the mitigation plan resume.

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Other concerns about the proposed wetland mitigation plan surround the Taliaferro and Terrell sites in the Rappahannock River watershed. The Mitigation Team conducted a single field visit to each of these sites; however, only preliminary information has been provided for those sites. Together, the two sites provide 235 acres of the proposed mitigation. District staff and agency representatives have not agreed to the viability of the sites because additional water budget information and detailed soils analyses have not been provided. In a 24 May 1999 letter to the District, the Service expressed concerns over the preliminary design plans for the Terrell and Taliaferro sites. The Service provided site-specific comments, which described serious design flaws in the conceptual plans. The Service had provided those comments based on the draft plans; however, in the Service's 22 July 1999 letter, they indicated that the same deficiencies and flaws were present in the Final Mitigation Plan. In their 28 November 2000 letter, the City of Newport News responded to some of the concerns about the Terrell and Taliaferro sites; however, the larger issues with those sites have not been resolved.

Without some assurances that the hydrology would be maintained in the future to sufficiently supply a created wetland, I cannot agree that a fully successful mitigation effort could be achieved. The Service maintains a strong belief that the District should not accept and approve a Final Wetland Mitigation Plan with the existing conceptual plans for the Terrell and Taliaferro sites. In a 6 August 1999 memo, EPA also conveyed similar concerns about the conceptual plans for the Terrell and Taliaferro sites. Because of the outstanding concerns regarding the two sites, EPA believes they should not be included in the Final Wetland Mitigation Plan until the conceptual design plans have been corrected.

An additional problem with the Mitigation Plan is that the use of the proposed mitigation sites has not been secured and some of the sites may not remain feasible. For example, the Bleak Hill/Ferry Farm site has been proposed for a mitigation bank by York River Mitigation Landbank, L.L.C. The District has received a Prospectus for the proposal outlining the intentions of the landowner to create a mitigation bank on the site. The Bleak Hill/Ferry Farm site was estimated as providing 126 acres of the RRWSG's mitigation plan.

Other screening factors, such as the presence of federally listed endangered or threatened species, could affect the use of particular sites or portions of sites or potentially only impose time of year restrictions on the construction work. The Virginia Department of Conservation Recreation's Natural Heritage in a 11 January 1999 letter indicated that federally listed threatened bald eagle nests have been located near Davis Farm and the Borrow Area. According to Natural Heritage the federally listed threatened small whorled pogonia may be present near the Borrow Area. In a January 14, 1999 letter to Environmental Specialties Group, the Virginia Department of Game and Inland Fisheries also indicated bald eagles may be present near the Davis Farm site and Lanesville. Small whorled pogonia plants may also be present at Lanesville. In a 26 January 1999 letter the U. S. Fish and Wildlife Services' Virginia Field Office recommended surveys for the small whorled pogonia on any of the mitigation sites that contained appropriate habitat. The Service also indicated that nests of the great blue heron have been documented near the Island and Rice sites.

In addition, not all of the mitigation sites have been screened for historic resources. It has come to the District staff's attention that the proposed Townsend wetland mitigation site is situated within the Marlbourne National Historic Landmark site (National Register Number: 66000837) in Hanover County, Virginia. A 1999 Phase I Survey report submitted by the applicant referenced the Marlbourne National Landmark, but did not indicate that the Townsend Site was within the Landmark boundaries and did not recommend additional surveys. According to the Virginia Department of Historic Resources, additional

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coordination under Section 106 would be necessary, and the effects of the proposed action on the National Historic Landmark would have to be coordinated with the National Park Service (Personal Communication, March 2001). The Gulasky Site was also reviewed in the 1999 Phase I Survey review. The report indicated that additional historic resource surveys may be necessary depending on the final mitigation plan.

Specific water budget information would be required to design final plans, which would need to be reviewed by District staff and the advisory agencies. Final approval from the District would be required prior to initiation of construction. The District and the federal agencies raised numerous concerns regarding the viability of some the mitigation sites, based on such variables as landscape position, contributing watershed for supporting hydrology, soil permeability, etc. Based on those concerns, the RRWSG proposed to construct three mitigation sites as demonstration projects prior to or concurrent with construction of the dam. The three sites determined to be the most problematic by the mitigation team were the Townsend site, Meadow Farm site B and Meadow Farm site C. Lessons learned from the demonstration projects would be applied to the remaining sites.

The design plans call for creating Palustrine forested, scrub/shrub, and emergent wetlands, as described under the Cowardin Classification system. The Hydrogeomorphic (HGM) Classification of wetlands that would be created has also been noted based on details provided in the plans for water source, the landscape position, and site location. The methodology of HGM can be found in "A Hydrogeomorphic Classification for Wetlands" by Brinson 1993 and "Assessing Wetland Functions Using HGM" by Brinson 1996. The concept of HGM was utilized to characterize the sites. A specific model was not developed, nor is the Norfolk District advocating development of a model. As stated in the "Evaluation of the King William Reservoir Final Wetland Mitigation Plan" by Darke, Daniels, Megonigal and Whittecar (2001), HGM is the best method for comparing the chemical and biological functions of the restored/created systems to those that would be lost. Systems with the same landscape positions, waters sources, and water direction and velocity are more likely to have similar functions. HGM groups wetlands by using those characteristics.

The majority of the wetlands created would be depressional, as their main source of hydrology would be from precipitation and surface runoff. Darke *et al.* (2001) stated "The new sites would largely be small, isolated, depressional wetlands with very little connection to adjacent natural wetlands or streams." I concur, because their landscape settings and water sources would be different from the well-integrated stream corridor complex of the Cohoke Creek system.

In their evaluation, Darke *et al.* (2001) also concluded that the functions of the Cohoke Creek wetlands that would be lost could not be replaced by the unconnected wetlands proposed in the plan. They agreed that the sites chosen would provide wetland restoration or creation and they acknowledged the presence of hydric soils and man-made ditches as being a positive aspect of the plan. However, they questioned the water budgets due to the lack of site specific hydrology data. They also indicated "...the general engineering concepts that are proposed are largely over-designed and/or unsuitable, either for the specific site or the desired type of wetland." Overall, they felt that the proposed designs would create areas that would be too wet to support Palustrine forested wetlands and would more likely develop mostly emergent wetlands.

Darke *et al.* (2001) point out that the wetlands that would be created would have a basin shape, little connectivity to nearby streams, and an overland surface flow or direct precipitation source of water,

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whereas the Cohoke wetlands have a variety of landscape settings, are closely connected to flowing waters and experience over-bank flooding. They noted "...the reduced level of water and nutrient exchange between the mitigation wetlands and adjacent streams would result in the development of systems that were more closed than those they were designed to replace." Darke *et al.* (2001) also questioned the designs of the mitigation plans and commented that the proposed impermeable bottoms would be constructed by compacting the soils. They raised concern for creating the impermeable layer, as it may inhibit plant root development.

Darke *et al.* (2001) indicated that to maximize wetland acreage, the plans show grading cuts that would create steep slopes along wetland margins. My staff commented that this design eliminates the transition zone between uplands and wetlands. Darke *et al.* (2001) also commented on the overuse of berms, which isolate the sites from nearby streams and existing wetlands. They indicated that much of the planned engineering was unnecessary for restoration of areas with hydric soils and farm ditches; and they concluded that with minimal engineering, wetland hydrology might be restored to roughly 537 acres of the sites with hydric soils. Darke *et al.* (2001) listed the following ecosystem services that they anticipated would be lost or seriously reduced if the plan was incorporated as proposed for the project: support for riverine plant and animal habitat; export of organic matter to maintain aquatic food chains; dynamic floodwater storage; and water quality values related to the retention and/or transformation of nutrients and sediment during overbank flooding.

The following is a brief description of each mitigation site in the Final Plan, with some of the District's concerns noted. The descriptions include site acreage and watershed information (see Map 5 - Wetland Mitigation Site Locations).

Bleak Hill /Ferry Farm

This site is located adjacent to the Pamunkey River and consists of 126 acres, which have been divided into three sections for the mitigation plan. Even though this appears to be a suitable site to the District and the federal agencies, it is recognized that Sites B and C will involve some earthwork and a water conveyance channel, which makes success of the design riskier. The hydrology would be supplied by stormwater runoff. The landscape position of the site is ideal; however, the wetlands would be depressional and would not be replacing the functions of the lost system. In addition, Darke, *et al.* (2001) indicated that this site would be wetter than the applicant anticipates and would not support a forested system. Extensive earthworking with sharp cuts was proposed which would result in steep slopes that would erode. Darke *et al.* (2001) felt the engineering design was not appropriate for the site. As noted above, this site has been proposed for a mitigation bank.

Burlington Farm

The 14-acre farm site would involve creation and restoration of wetlands. Although the site is small it does contribute to the overall Mitigation Plan, since it drains to the Meadow Farm Site and a corridor between the two sites could be protected. The tributary on the site flows to the Mattaponi River. The existing ditches on the site would be filled to allow water to disperse across the site. Minor earthwork would occur and a water conveyance channel would be installed. Most of the area is underlain by hydric soils. Burlington Farm would contain only slope and depressional type wetlands that would not replace the functions of the impacted system. Darke *et al.* (2001) noted the poor stream connectivity due to the proposed berm and indicated that the design was inappropriate for forested wetlands, because it would create a wetter than anticipated site. Sharp downcuts, which would cause erosion, were also noted.

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Davis Site

The plan for the Davis Site, which drains to the York River, is to restore/create 12 acres of wetlands in the existing farm field. The majority of the work would be creation, since hydric soils are only around the existing wetlands. Grading would be required to create wetlands, which would be supported by a relatively small drainage basin. The hydrology would be supported by runoff and precipitation. Protection of the drainage basin may be necessary to ensure long-term success of the wetlands. The wetlands would be created along a stream channel, but would be depressional for the most part and would not replace the function of the impacted system. *Darke et al. (2001) commented on the poor stream connectivity, which would reduce the functional value of the wetlands. The proposal involves cutting down the surface to remove the A Horizon which would make revegetation more difficult. Darke et al. (2001) found the water budget to be uncertain due to the lack of site specific data.*

Gulasky

The Mitigation Plan includes restoration/creation of 33 acres of wetlands on this site, which drain to the Pamunkey River. No perennial or intermittent streams flow onto the site; therefore, the hydrology relies on runoff from the drainage area and precipitation. The slope wetlands would be created by installing small berms to hold the water on the site. The District had some concerns regarding the cross-sectional drawings, which show upland at elevation 56 and wetlands at elevation 59. This seems to be creation of a perched wetland that may not be sustainable in the long-term. For Site B the plan calls for installing a 12-inch berm, which would go through existing wetlands on the south side of a ditch. Further review of the necessity of placing a berm in existing wetlands would be needed. The plan calls for cutting and filling in other areas to create the slope wetlands, which would not replace the functions of the impacted wetlands. *Darke et al. (2001) indicated that the design was not appropriate for creation of a slope wetland. Major uncertainties about the ultimate hydrology were noted due to lack of site specific data.*

Island Site

The landscape position of this site is very favorable, since it is surrounded by existing wetlands. The major concern on this site is that too much creation would be forced onto a site that cannot support that much wetland creation. The plan calls for creation of 79 acres of wetlands along existing wetlands and drainageways. The source of hydrology is intercepted stormflow from Moncuin Creek and precipitation. The predominance of non-hydric soils within the proposed wetland area would need to be overcome by adding organics. Creation of wetlands here may be risky, but the benefits are taking the site out of farm production and preserving the wetlands and uplands. *Darke et al. (2001) felt that the proposed berm should be eliminated and the elevation of the mitigation area should be cut down to the water table.* The existing road into the site acts as a dam and could potentially affect the hydrology of the site. This would need to be further investigated. The Island Site would provide some wetlands, which would have a riverine component; otherwise they would be classified as depressional. This site has a favorable landscape setting; however, it would be important not to force wetlands into inappropriate areas on this natural upland island.

King William Sand and Gravel Site

The 38-acre farm field would be restored and created into wetlands that would provide some riparian habitat to the Mattaponi River. The hydrology would be from surface water flows, so concern is for protection of the drainage basin and future land uses. The proposed restoration/creation areas include both hydric and non-hydric soils. Hydric soils are only found in the northern portion of the site, next to the existing wetlands. The plan calls for adding small berms to capture and hold water on the site longer. The site has a great deal of potential, but the District does question whether wetlands would be

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established up to elevation 48. Water from the intermittent drainage would be routed to enter the mitigation site and the drainage ditch in the center of the field would be filled. The wetlands created on the site would be slope and riverine which would be similar to the impacted wetlands. Although the site is adjacent to Boot Swamp Creek, the design does not include diversion of water away from the creek. The wetlands would flow into that creek further downstream. *Darke et al. (2001) questioned the proposed compaction of the soils to seal the bottom which would create a perched system. Compaction would make it more difficult for vegetation to establish. Darke et al. (2001) also felt the design was not appropriate for creating slope wetlands.*

Lanesville

The Lanesville site contains 33 acres of farm field that would be restored/created into wetlands that would drain to a tributary of the Pamunkey River. The hydrology would be a function of direct precipitation, surface water runoff, and groundwater seepage. The main source of hydrology would be surface water flow. Since the majority of the drainage area is offsite, there is concern about a viable long-term source of hydrology. The wetland creation/restoration would be completed by filling the existing shallow ditches and installing a 2-foot rise along one side of the property to hold water on the site. Most of the creation/restoration area contains hydric soils. In fact, a portion of the area along the slope already contains hydrophytic vegetation and would be considered farmed wetland pasture. The District would have concerns with the proposal to create wetlands at elevation 40 adjacent to existing uplands at elevation 34 as it would create a perched system. In addition, wetlands with a seasonally flooded regime are proposed to be created in that perched area that is underlain by mostly non-hydric soils. Some work would need to be done on this plan to show that creation of 33 acres is feasible. *Darke et al. (2001) also questioned the use of compaction and the extensive berming, which would reduce connectivity. In this case, they felt the site would be too dry.* Slope and depressional wetlands would be created, so this site would not replace the functions of the riverine wetlands found in the Cohoke Creek system.

Meadow Farm A

This site is located immediately adjacent to the Mattaponi River, so it has good connectivity. It contains 71 acres of farm field, an open water pond, forested wetlands and forested uplands. Farmed wetlands are present on this site adjacent to the pond. There is a natural levee between the site and the River. The hydrology would be based on surface water flow. The perennial stream adjacent to the site would also be diverted to provide water as sheet flow across the site. The 21-acre farm field would be converted to wetlands, the existing pond would remain unchanged, and some upland restoration would occur. Since farmed wetlands are present on a large portion of the field, that area would actually be enhancement. *Darke et al. (2001) were concerned about the use of compaction to seal the site due to difficulties with revegetation. They indicated that the site was vastly over-engineered, would probably be flooded year round, and would not support forested wetlands.* Excavation would create a depressional landscape fed by surface water flow and precipitation, so these wetlands would not replace the functions of the impacted wetlands.

Meadow Farm B

The proposal for this site involves converting an abandoned sand and gravel mining site into wetlands along the Mattaponi River. Wetlands in this landscape position could provide some riparian habitat and water quality benefits. Careful consideration would need to be given to soil amenities, since previously mined areas often contain very sterile conditions. *In addition, Darke et al. (2001) noted the site was underlain by a silty bed, which is marginally sulfidic, so acidification could be a problem if those materials were uncovered.* The hydrology would be based on a seasonal high water table and some

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surface flow. This system would be connected to the Mattaponi River and would have more of an opportunity to become naturalized than the proposed borrow area, which was not favorable to the District or the agencies. *Darke et al. (2001) stressed the need for site specific groundwater monitoring and a reduction in the steep slopes.* The mined areas would be filled up to wetland elevations creating approximately 57 acres of depressional wetlands unlike the impacted wetlands.

Meadow Farm C

This site consists of 169 acres of pasture and cropland, and the majority of the fields are underlain by hydric soils. The landowner modified the hydrology by installing ditches and some drain tile. The plan calls for capturing surface water and holding it on the site for prolonged periods. The long-term availability of hydrologic inputs from the drainage area of this site would be a concern, since the wetland mitigation site would be supported by surface runoff and precipitation. Approximately 30 acres of the site contains hydric soils and only minor earthwork would be required to accomplish the restoration. The other 43 acres does contain hydric soils, but grading has been proposed to create wetlands on this part of the site. The proposed elevations of the water conveyance may be problematic. The proposal on the east side of the site shows a perched wetland at elevation 52 and there are existing uplands at elevation 40. The plan calls for filling a slope from elevation 40 to 52 and installing a reinforced water conveyance channel creating a perched wetland system. *Darke et al. (2001) noted the soil compaction used to create the flat, sealed basin. They felt the site would be too wet for forested species.* Approximately 73 acres of depressional wetlands would be created. The created wetlands would not replace the functions of the lost wetlands. Several District and agency team members had concerns over the proposal for this site, so the RRWSG agreed that it would be constructed first as a demonstration project.

Rice Site

The Rice Site consists of 33 acres of farmland that would be converted to wetlands. Almost all of the soils in the farmed area are non-hydric, so this would be considered creation. The hydrology would be supported by surface flow and precipitation. The site has a small watershed consisting of existing farmland. This could be a concern if the drainage area was developed and stormwater was routed away from the site. The plan calls for matching the elevations of the Pamunkey River floodplain, which is immediately adjacent to the site. The created wetlands would connect to existing floodplain. Even though this site is small and would contain creation, the landscape position across the Pamunkey River from the Island Site makes it favorable. Approximately 33 acres of riverine wetlands, which are similar to the impacted wetlands, would be created. *However, Darke et al. (2001) indicated that groundwater was not included in the water budget and as designed, the site would be too wet. They also noted the steep cuts that would erode and could predispose the site to failure.*

Taliaferro Site

A 42-acre farm field would be converted to wetlands and 3 acres of existing forest would be hydrated to restore/create wetlands in the Rappahannock River watershed. The site contains hydric soils and has been ditched to facilitate drainage. The hydrology would be supported by surface flow and direct precipitation. The existing swales and ditches would be backfilled to restore wetland hydrology to the field. The District concurs with the Service's concerns about the plans showing a water conveyance channel at elevation 28.5 and wetlands at elevation 30.5. Without additional information, it would be difficult to determine if that proposal is feasible. The majority of the watershed contributing to the hydrology is offsite and future development could have an effect on the long-term sustainability of the wetlands. *Darke et al. (2001) noted that this site was over-engineered.* The wetlands that would be restored would be considered depressional and would not replace the lost functions of the Cohoke wetlands.

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Terrell Site

The 300-acre tract is currently open farmland off Route 17 in the Rappahannock River basin. The agencies and the District do not agree with the RRWSG that the site could support creation/restoration of 300 acres of wetlands. A somewhat tentative consensus was reached for 190 acres of creation/restoration. The hydrology would be based on surface runoff from surrounding sites and an offsite pond that flows into the site. The future use of the pond and the contributing watershed would be a concern, since this water is needed to support the hydrology of the wetland mitigation area. The existing ditches would be filled and a berm would be installed along the northern edges of the site to hold water for longer durations. Rough areas and depression would also be added for diversity to this surface water site. A large portion of the site contains hydric soils and the plan does not propose any major grading. However, Darke *et al.* (2001) indicated that the water budget and the type of soils present caused concern. This soil type had caused problems at other mitigation sites, because it has a subsoil clay layer, which can be plastic, with a shrink-swell potential. The lower and middle portions of the site seem to be the most promising. The upper areas, closest to Route 17 appear to be more problematic. The District finds potential for restoration of wetlands on the site, but fears that the hydrology may not support the larger acreage proposed by the RRWSG. Darke *et al.* (2001) concluded, "Without site-specific watertable data, it is impossible to predict whether a suitable wetland hydrology can be established at this site." The proposed berming would reduce the connectivity of the site. Depressional wetlands, that would not replace the functions of the Cohoke wetlands, would be created on the site.

Townsend Site

This site consists of 90 acres of farmland that would be restored/created into wetlands. Part of the site drains to a tributary to Totopotomoy Creek and the other part flows under Route 360 to a pond that discharges to the Pamunkey River. The hydrology would be supplied by surface flows and direct precipitation. The plan calls for backfilling the existing drainage ditches and installing water conveyance channels. The proposal involves only minor earthwork and a large part of the site is underlain by hydric soils. One concern for this site would be the lack of control over the drainage area, especially since it is along the Route 360 corridor. Some of the proposed elevations on the cross section also would need to be further reviewed to determine if they are feasible. Darke *et al.* (2001) indicated that the soil types present tend to be wet and groundwater inputs were not included; therefore, the site would likely be too wet for forested species. The Townsend site would produce slope and depressional wetlands, which would not replace the functions of the impacted wetlands. As noted previously, there are additional historic resource concerns surrounding this site.

Contingency Sites

Although the Mitigation Team has not reviewed the Hollyfield Farm, Chericoke Farm or the Wood Farm Sites, it appears on cursory review that they may have potential for wetlands restoration/creation. These sites contain large acreages of hydric soils and they drain to the Pamunkey River. Additional acreages at primary sites were also included as contingency acreage. While the District has not agreed that additional acreages would be feasible, any additional acreages achieved would be considered if a permit for the reservoir project was issued.

The Mitigation plan could fall short by as much as 431 acres due to the uncertain feasibility of the 90-acre Townsend site, problems with the designs of Terrell and Taliaferro (combined acreage of 232), and due to changes in the conceptual plans that appeared in the Final Wetland Mitigation Plan, for Gulasky, Lanesville, and Meadow Farm C (an additional 109 acres). The Townsend Site is potentially located

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within a national historic landmark and its use may be limited. Additional problems with the designs and water budgets of the Terrell and Taliaferro Sites have been identified by the District and the agencies, and Darke *et al.* (2001). The plans for these two sites are not acceptable as submitted, and additional field work would probably be needed to develop suitable wetland restoration/creation designs. During the field visits the District and the agencies agreed that opportunity exists for wetland creation/restoration on the proposed sites in the Final plan; however, the District and the agencies do not agree with all aspects of the conceptual plans.

The District staff believes that the proposed sites included in the Final Mitigation Plan are acceptable as compensatory mitigation sites; however, the wetlands created would not replace the functions of the wetlands that would be impacted. In addition, the applicant altered the design plans submitted in the Final Plan from those previously submitted. The changes to the design plans have caused my staff additional concerns over the sustainability of the proposed wetland creation. My concerns and some of the concerns expressed in the evaluation by Darke, *et al.* (2001) are outlined above. I agree with the findings in Darke, *et al.* (2001), and if I were to issue a permit for this project, I would request changes to the design plans to address these concerns.

(x.) Mitigation Program, Fish and Wildlife Mitigation Plan: On 06 October 1999, Malcolm Pirnie submitted the Mitigation Program, Fish and Wildlife Mitigation Plan for the RRWSG. The purpose of the report was to tie together all aspects of the mitigation proposals including the functional assessments and the stream restoration. The plan summarized the acreage of mitigation proposed including the upland buffer areas, which are part of the mitigation sites. In most cases, the RRWSG would be required by existing landowners to purchase whole parcels including upland. The remaining upland would act as buffers to the created wetlands.

One of the shortcomings of this report was that a great deal of the information it contained was based on studies, such as the Fringe Report, that had been rejected by the District and the agencies. Also, the functional assessments, WET and EPW were performed without input from the federal agencies and several of the assumptions made for the methodologies were seriously flawed (see Functional Assessments, 8 f. (2) (d) above). The Mitigation Program, Fish and Wildlife Mitigation Plan indicates valuable shoreline wetlands and shallow water habitat are expected to develop around the proposed reservoir. These potential wetland areas were not included as mitigation due to the fluctuating water level in the proposed reservoir, the steep slopes down to the water's edge and the questionable nature of their development and sustainability.

The report also addressed other forms of mitigation. One section discussed support to the Pamunkey and Mattaponi Indian Tribes for the fish hatcheries on the Tribal Reservations. This type of mitigation cannot be used as compensation for wetland impacts, but may be evaluated for other public interest review factors.

The Mitigation Program, Fish and Wildlife Mitigation Plan indicates that the Wetland Mitigation Plan exceeds the District's wetland compensation requirements by 137 acres. The difference in acreage is based on a full 2 to 1 ratio versus a 1 to 1 ratio for emergent impacts and a 1.5 to 1 ratio for scrub-shrub impacts. The RRWSG's Final Wetland Mitigation Plan includes 806 acres of potential restoration and creation of wetlands to meet the 2 to 1 ratio generally required by the District for forested wetland impacts. The Norfolk District Regulatory guidance on mitigation ratios provides compensation ranges between 0.5 to 1 and 1.5 to 1 for emergent wetland impacts, between 1 to 1 and 2 to 1 for scrub-shrub

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wetland impacts, and between 1.5 to 1 and 2 to 1 for forested wetland impacts. The guidance also states “in any specific case the appropriate ratio can vary from zero to infinity...based solely on the functions and values of the aquatic resources that will be impacted.” Originally the RRWSG had proposed a 1 to 1 ratio for all the impacts, including impacts to the forested wetlands. The District indicated that 1 to 1 was not acceptable and that a 2 to 1 ratio for the impacts would be needed to even begin to offset the impacts to the Cohoke wetland complex. Utilizing a 2 to 1 ratio is needed to address the temporal losses associated with replacing a highly diverse system with a newly created wetland.

In their 28 November 2000 letter, Newport News addressed this issue again and reiterated how their Mitigation Plan goes beyond the general requirements of the District’s mitigation policy. The District determines mitigation ratios on a case-by-case basis for each project depending on the size of the impact and the quality of the system. In the paper entitled “Evaluation of the Effectiveness of Within Watershed Compensation in Response to Permitted Activities through the Norfolk District’s Section 404 Regulatory Program,” Jones and Boyd reported that an overall mitigation ratio of 1.7 to 1 was achieved during the assessment period of 1996, 1997 and 1998. That overall ratio took into consideration projects that involved impacts to emergent, scrub-shrub and forested wetlands.

It is not unusual for the mitigation ratios to be higher for a project with impacts of the magnitude proposed by the RRWSG. Generally when the Corps permits project impacts with mitigation, the project does not eliminate an entire, highly diverse system such as would be impacted by this project. It is not appropriate to compare the ratio of mitigation required for this project with other projects reviewed by the District, since this project would have substantial impacts (orders of magnitude higher than usual projects) to an entire wetland system. The proposed project represents a larger impact than the Norfolk District typically authorizes in a single year for all projects. According to the Norfolk District Regulatory Database, the District permitted a total of 394.4 acres of impacts in 1996, 267.5 acres in 1997 and 266.4 acres in 1998. These impact totals are for the entire state for each individual year. The impacts from the King William Reservoir would be more than the total amount of impacts typically permitted in an entire year in the State of Virginia.

(xi.) Stream Compensation: The mitigation proposal for the 21 miles of stream channel impacts includes restoration of 21 miles of stream channel in other off-site locations. The proposed stream restoration plan is described in the May 1999 Final Wetland Mitigation Plan. The consultants have identified degraded stream systems in the Green Springs National Historic Area in Louisa County, Virginia. On 23 February 1998, District and Service representatives reviewed the potential stream restoration sites. The area includes both intermittent and perennial stream channels. Many of the streams have been affected by livestock. The RRWSG proposes to analyze each particular stream using the following parameters: stream bottom and bank conditions, erosional forces, width and presence of vegetated buffers, and the practicability and long-term success potential of performing the work. The proposal for each stream restoration effort would vary depending on the condition and the reasons for the degradation. Options could include encouraging development of riparian buffers, nutrient and pesticide management, livestock exclusion through fencing, and bioengineering to reduce erosional forces. The goal of the proposed work is to improve water quality in the streams and increase the habitat value. Where possible, preservation of the restored channels and other land use restrictions would be utilized to protect the stream corridors from additional impacts. However, conservation agreements may not be in perpetuity and would be dependent on agreements with individual landowners. The landowners’ desires and the RRWSG’s ability to maintain the fencing in the future would also affect the amount of protection to the streams.

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At the Mitigation Team meeting on 26 June 1998, the RRWSG indicated that 21 miles of intermittent and perennial stream channel restoration would occur at a 1 to 1 ratio for stream miles and stream order. Specific proposals for stream restoration have not been submitted to the District and the agencies, so it is difficult to determine if that goal was met. No further discussion about the stream order of the restoration channels was offered. In addition, the long-term benefits and success of the proposal are difficult to determine without knowing the level of individual landowners' participation and willingness to continue the stream restoration in perpetuity.

The May 1999 Wetland Mitigation Plan also indicated 6.4 miles of stream between the proposed dam and the Cohoke Millpond would be preserved. As discussed previously, the RRWSG has been unwilling to propose preservation in perpetuity in hopes of using the area in the future for expansion of the dam if the project is permitted. This is not an acceptable mitigation option since the long-term viability is questionable.

The Mitigation Team has also discussed restoring stream channels on some of the proposed mitigation sites, such as Davis Farm, Terrell and Taliaferro sites. Stream restoration has been encouraged in corridors, which would tie into other natural wetland systems. Breaching impediments to anadromous fish migration has also been suggested as being connected to the stream restoration plans.

While stream restoration alone is commendable, the action still does not compensate for the loss of a stream valley complex found in the Cohoke system. The Service expressed their concern for the disjointed form of compensation in a 22 July 1999 letter to the District addressing the Final Wetland Mitigation Plan. The Service indicated, "The applicant's Final Plan proposes to perform stream mitigation predominantly separate from the wetland mitigation, further demonstrating that the stream valley wetland complex has been torn into two disjunct, ecologically disconnected components for mitigation purposes." I do not believe that the proposed stream restoration could fully mitigate for the loss of 21 miles of contiguous stream channel.

(xii.) Environmental Issues Summary: The RRWSG submitted the Environmental Issues Summary in August 1999 in response to my preliminary position of denial of the project. The RRWSG indicated that report was not intended to provide new information, but to summarize their project and reiterate all the benefits they believe the project would provide. However, the report made many claims that had not been made previously and were not substantiated.

The RRWSG contends that a positive net environmental impact can be achieved when implementing the King William Reservoir Final Mitigation Plan. The District agrees with EPA's opinion that, "There is no net gain as a result of the RRWSG mitigation plan but rather, if all goes as planned, an offset of impacts, a compensating equivalent [in wetland acreage]." An offset of the acreage of impacts is only seen if the mitigation sites are fully successful. The Environmental Issues Summary indicates that the open water of the reservoir and the mitigation sites would represent a net gain in wetlands. The District believes that over several years, a net gain in acreage may occur if all the proposed mitigation is fully successful. However, a gain or even a compensatory equivalent in net function has not been demonstrated. EPA has maintained their belief that "the complex mosaic ecosystem which will be impounded by the reservoir can not be replicated." The Service expressed similar opinions in a 25 July 1997 letter, "Based on the Service's extensive involvement evaluating the evolving wetland mitigation plan, we do not see the possibility that the applicant can adequately replace the wetland functions, contiguous habitat, and wetland types that the project proposes to impact."

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(xiii.) Uplands Preserved: The City of Newport News has included as a part of their mitigation package those remaining portions of several of their mitigation sites (totaling approximately 1,000 acres) that are unsuitable for wetland compensation, as buffer areas adjacent to the created and restored wetland areas. These upland areas must be purchased along with mitigation site. In many cases these upland areas comprise a portion of the contributing watershed to the proposed compensation sites, and their preservation would help ensure the long-term protection of at least a small part of the hydrologic inputs from the catchment.

The RRWSG's Mitigation Program, Fish and Wildlife Mitigation Plan also offers as compensation for the upland that would be inundated by the reservoir, the 1,900 acres of upland forest that surrounds the reservoir as a buffer. The 100-foot water quality buffer would total 1,300 acres and the 100-foot construction setback, in which development would be limited, would be 600 acres. The mitigation proposal also includes the temporary preservation of 620 acres of upland located between the proposed dam and Cohoke Millpond. However, as the upland below the proposed dam would not be held in perpetuity, future impacts could occur in that area.

The City claims that their preservation of upland would create large areas of habitat for species that require contiguous hardwood forests and that the reservoir buffer would provide forest and riparian edge habitat that can support several species. The 100-foot construction setback provides no guarantee that an undisturbed forested area would remain. It is unclear as to whether that construction setback buffer would be owned by the adjacent property owner or the City of Newport News. The benefits to wildlife would be limited due to use of the reservoir and surrounding land for recreation and by any future adjacent property owners.

In a 16 July 1997 letter, Natural Heritage concluded that the total 200-foot wide construction setback and water quality buffer would essentially be edge habitat, not contiguous forest with habitat value to interior dwelling species. Species in this area would be trapped between the reservoir and rural/suburban development on the other side. Natural Heritage indicated that research has shown such areas in forest patches are actually detrimental to breeding neotropical migratory bird species.

(f) Summary of District's Findings on Compensation Proposals: In the 28 November 2000 letter addressing the agencies' response to the Final Mitigation Plan, Newport News rebutted the opinions that the Plan offers mitigation that is hydrologically and ecologically out-of-kind. In "Mitigation Technical Guidelines for Chesapeake Bay Wetlands," which was published with interagency cooperation in 1994, Eckles *et al.* define in-kind replacement as "compensatory mitigation activities which replace the hydrologic core and structural factors, ecosystem processes, functions, and values of a project wetland." As noted in "Mitigation Technical Guidelines for Chesapeake Bay Wetlands," "wetland communities located within a riparian corridor are affected by stream hydraulics (e.g., overbank flow rates and duration, sediment deposition, and scouring), whereas other wetland communities are more affected by groundwater, direct precipitation, and surface runoff. The hydrologic core factors of the two communities are different." Different sources of water and energy of flows affect the nutrient cycling, community dynamics, organic matter production, decomposition, and export of carbon. It is important to note that the proposed sites generally do not provide in-kind replacement of the Cohoke stream valley complex.

The concept of impacting one large wetland system and replacing it with smaller wetlands located throughout the watershed is contrary to the mitigation banking policy used by the Corps. The "Federal Guidance for Establishment, Use, and Operation of Mitigation Banks" indicates that mitigation banking

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“typically involves the consolidation of small, fragmented wetland mitigation projects into one large contiguous site.” Consolidating the impacts helps to more effectively replace lost wetland functions. Replacing a large contiguous wetland system with individual sites scattered throughout the landscape does not fully compensate for the proposed losses. While the individual sites do provide a habitat benefit, they cannot compensate for the loss of a large contiguous system with inter-related upland, vegetated wetlands, shallow open water, and varying hydrologic regimes. Piecemealing the compensation sites in the various hydrogeomorphic settings cannot fully compensate or provide the same functions as the existing free-flowing riverine system of the Cohoke Creek.

The 34 acres of open water that would be impacted by the project would not be offset by the creation of the 1,526-acre lake as claimed by the City of Newport News. These water regimes are totally dissimilar and do not provide the same types of wildlife habitat or water quality functions. Also, the applicant’s proposed enhancement and restoration of other streams does not replace the streams that would be lost. Furthermore, open water areas have limited functions, which are not typically as valuable as the functions of existing swamps, such as found in the Cohoke system.

In a letter dated 12 March 1997, VIMS expressed concern over the success of the applicant’s mitigation proposal. “It is not clear that highly scattered areas of creation, restoration and preservation will accomplish the compensation goal envisioned for them given the overall complexities of the present landscape and our relative lack of sophistication at present when it comes to evolving wetland-landscape interactions.” EPA commented that the diverse wetland communities at the King William site might be extremely difficult, if not impossible, to adequately replace. In a letter dated 23 August 1996, the U. S. Fish and Wildlife Service commented, “The Service does not believe it is practical or possible to mitigate for the loss of an entire watershed. To attempt to mitigate for the steeper mature forest uplands grading into very wet palustrine forests and emergent systems requires a unique mix of landscape position and quantity, seasonality and duration of hydrology.”

Newport News has identified acreage for 2 to 1 compensation. However, their plan has not demonstrated functional compensation for the wetland impacts or that there would be adequate hydrology to support the desired wetland species at all sites. The proposed mitigation sites do not re-create the stream valley wetland complex of the Cohoke wetlands that would be lost. I am concerned about replacing the free-flowing stream valley complex with mostly depressional wetland systems that do not replace the functions of the impacted wetlands. I am also concerned about replacing one large contiguous system with smaller unrelated sites. (A more detailed discussion of the various compensation proposals can be found in Norfolk District’s report entitled “Analysis of wetland and habitat impacts and the Regional Raw Water Study Group’s proposed compensation for the proposed King William Reservoir.”)

(g) Comments Received on the RROD Regarding the Applicant’s Compensation Proposals:
Comments were received from the following:

City of Newport News on behalf of the RRWSG
Mayor Joe S. Frank, City of Newport News
Randy Hildebrandt, Newport News City Manager
James S. Gilmore, III, Governor of Virginia
Virginia Department of Environmental Quality
Environmental Protection Agency
U. S. Fish and Wildlife Service

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Southern Environmental Law Center
Chesapeake Bay Foundation
Donald Rice, Newport News Waterworks employee
Malcolm Pirnie, Inc.
Langhei Ecology
Joseph A. Landrum, P.E.

The City of Newport News on behalf of the RRWSG implied that the District's position on mitigation had changed over time. The District's position has not changed over time. The Corps is required by the 404 (b)(1) guidelines to include all appropriate and practicable mitigation and requested a plan from the City to evaluate whether this requirement had been met. The MOA between the EPA and the Department of Army concerning mitigation indicates that "information on all facets of a project, including potential mitigation, is typically gathered and reviewed at the same time." At no time did the District imply that a permit would be issued if the applicant submitted a mitigation plan showing 2 to 1 replacement acreage. The applicant's mitigation plan is not being used against them as they contend in their comments. My staff has evaluated the plan and determined that on an acreage basis, the goal of 2 to 1 wetlands restoration/creation could be met, but the mitigated wetlands would not compensate for the functions of the area that would be impacted. As stated on page 69 of the RROD, the 1990 Memorandum of Agreement (MOA) between the Corps and EPA regarding "The Determination of Mitigation Under the Clean Water Act Section 404(b)(1) Guidelines" states that the "objective of mitigation for unavoidable impacts is to offset environmental losses...such mitigation should provide, at a minimum, one for one functional replacement..." (emphasis added). Both the HEP and mitigation interagency teams, which included the RRWSG and their consultants, agreed to address mitigation through the HEP study and use these results to guide the development of the mitigation plan. This did not happen.

The City of Newport News and Donald Rice contend that the mitigation plan was prepared with a deliberate effort to address agency concerns; and that eight versions of the proposed plan were submitted; each better and more comprehensive than the one before. I agree that the applicant submitted plans that built on one another and were generally more comprehensive than the ones before. Several versions of the plan were submitted prior to formation of the mitigation team. The submittal of eight different plans was not requested by the District and was done so at the discretion of the applicant. The applicant's own chronology demonstrates that the mitigation progress started without accurate knowledge of the extent and functions of the wetlands to be impacted and that the mitigation had to evolve as the project changed. In addition, earlier submitted plans contained sites that the District and agencies had not previously seen and some of those were later found to not be feasible. Early on, the RRWSG claimed their mitigation plans had achieved full functional replacement before the HEP study or other functional assessments were even finished. Therefore, it was difficult to understand how the RRWSG could have determined at that point that full functional replacement was achieved. Also, the plans changed when the applicant hired a new lead mitigation consultant.

The City of Newport News contends that their Final Plan was submitted for the purpose of soliciting comments, but no comments were received from the District or the agencies until the RROD was published. Governor Gilmore questioned why work on the mitigation plan came to a halt following my 4 June 1999 letter stating my preliminary position to deny the permit. Since the applicant had submitted their May 1999 "King William Reservoir Project-Final Mitigation Plan" as their final wetland mitigation proposal, my staff reviewed the plan and prepared their comments to be included in the RROD. Even if I had not stated my intention to deny the permit, my staff would have prepared formal comments on the

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Final Plan for the RROD. The RROD would have been released much closer to the date of that submittal had the applicant not requested a 7-month extension to prepare additional information. Therefore, the RROD was not finalized until the applicant's additional information was received and reviewed.

The City of Newport News indicated that they have worked diligently, patiently, and in good faith with the District and the agencies. The applicant contends that some of the issues might be resolved by adjusting the Final Mitigation Plan and through permit conditions. I agree that the applicant has worked diligently in participating in the mitigation team effort. I also agree that some of my staff's concerns with the Final Mitigation Plan could potentially be worked out through adjustments to the design. However, even a lengthy permit process must have an end, and at 12 years and counting, this has already been the lengthiest permit evaluation in the history of the Norfolk District's regulatory program by far. In addition, I did not reach my position to deny the project solely on the basis of whether or not the wetland impacts could be mitigated.

The City of Newport News maintained their position that the mitigation plan would compensate for the lost functions and questioned the District's interpretation of In-Kind mitigation. Newport News claimed that the District was not consistent in characterizing the wetland areas, referring to the use of the term palustrine, which is a classification under the Cowardin System. The City of Newport News contends that the District called the Cohoke wetlands both Palustrine and Riverine. Both the Cowardin and HGM wetland classification systems have been used, in which the term "riverine" has different meanings. This issue has been clarified in the Final RROD.

The City of Newport News indicated that the Wetlands Management Handbook published by the U.S. Army Engineer Research and Development Center's Environmental Laboratory in December 2000 says that the Cowardin system is the most widely used classification system. However, the Handbook goes on to say, "the use of this standard is not for regulatory purposes." The definition of In-Kind from the Handbook specifies that the wetland impact area and the mitigation area both be of the same classification, but does not cite the Cowardin Classification as the basis for the determination. The District considers more than just covertype when determining if a mitigation area provides In-Kind compensation. The Handbook also says, "In-Kind Mitigation is likely to replace impacted functions and values."

The City of Newport News questioned the use of the term "depressional" since there is no category for depressional under the Cowardin Classification. They also claimed that the District developed a "mysterious new classification system." The Corps Wetlands Management Handbook referenced by Newport News discusses the Hydrogeomorphic (HGM) Classification System, which does have a "depressional" class. HGM is described in "A Hydrogeomorphic Classification for Wetlands," by Brinson (1993). This classification system of wetlands is based on the geomorphic setting, water source, and water flow patterns; and evaluates wetland functions by grouping functionally similar wetland types. As stated in Darke *et al.* (2001), HGM is the best method for comparing the chemical and biological functions of the restored/created systems to those that would be lost. Systems with the same landscape positions, waters sources, and water direction and velocity are more likely to have similar functions. Under the HGM classification, Riverine wetlands have unidirectional flow through them and the dominant source of water is overbank flow from the channel; whereas depressional wetlands have vertical water flow and their main source of hydrology is precipitation and some surface runoff from surrounding areas. Depressional wetlands have different functions from Riverine wetlands. The objective of

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mitigation under the Corps and EPA MOA is to replace the functions of wetlands, not just acreage and vegetation cover type.

The Virginia DEQ commented that the District routinely accepts mitigation that is out-of-kind and off-site or heavily reliant on preservation. They also questioned whether the District was now introducing a new standard by requesting mitigation to be hydrogeomorphically in-kind. For many projects, the District has indeed accepted mitigation in the form of off-site wetland creation and restoration, accompanied in some cases by preservation. These projects generally involve small impacts to wetlands, whose functions can be replaced in this way. Mitigation banks are encouraged in many cases as they combine small wetland mitigation sites into larger, contiguous and more highly functioning wetlands. However, the King William Reservoir project cannot be compared to a small, routine project; and the diverse, complex and intact Cohoke Creek ecosystem cannot be replaced by numerous, depressional wetland fragments. In fact, 1 to 1 functional replacement is required for Individual Permits per the 1990 MOA between the EPA and the Corps.

The City of Newport News commented that all but one of the selected sites are situated near a major riverine corridor and that the sites are not bowl shaped, but are gently sloping drainageways. The sites are in close proximity to riparian corridors, but some have little connection to the corridor. The design plans call for making many of the sites flattened depressions or in other cases perched wetlands through cutting and filling along slopes. Independent review of the mitigation plan by Darke *et al.* (2001) stated “The new sites would largely be small, isolated, depressional wetlands with very little connection to adjacent natural wetlands or streams.” I concur with this conclusion.

The City of Newport News disputed the District’s findings that the proposed impact areas are more valuable than the restored and created wetlands. They claim that no studies have been identified or conducted to show that the mitigation acreage would not be as structurally complex and diverse as the Cohoke Creek wetlands. It should be noted that no studies have been submitted to support the applicant’s claim that the proposed mitigation areas would be diverse and provide valuable ecological functions. It is widely accepted that newly created wetlands do not initially provide the same functions as mature, diverse systems; and the functions of certain types of systems, such as the Cohoke Creek system, are particularly difficult to mimic or replace. Therefore, the District is comfortable with the conclusions in the RROD.

The City of Newport News disagreed with the District’s position that the mitigation plan would not fully compensate for the losses, as the RRWSG’s plan offered full 2 to 1 replacement. Governor Gilmore also disagreed with the statement in the RROD that the mitigation plan may fall short of the 2 to 1 goal of wetland acreage replacement. The Governor contended that the applicant would be required by the DEQ permit to provide replacement mitigation projects if any site failed. The RROD indicated that with changes to the plan and use of contingency sites, the goal of 2 to 1 replacement could be met. However, as discussed on page 103 of the RROD, the proposed plan would not replace the functions of the Cohoke Creek system. The District would also require replacement mitigation acreage, which the applicant proposed to be from the contingency sites listed in their Final Mitigation Plan. My staff has not seen the contingency acreage, so they could not agree that those sites would be acceptable. While any District permit would require that failed sites be rectified, some assurance of potential site success would be needed. The Governor may be confident that the Final Mitigation Plan would compensate for wetland losses and adequately replace functions, but I disagree. The Mitigation Plan, consisting of several sites scattered throughout a large area, would not replace the functions of the contiguous and highly diverse

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Cohoke Creek wetland system. This is supported by many of the functional assessments conducted for this project (e.g., HEP, TNPP, sediment retention analysis, and nutrient assimilation assessment).

The City of Newport News indicated that they were not receiving mitigation credit for their offer to preserve over 600 acres of wetlands (including areas downstream of the dam). DEQ also questioned why the District would not accept preservation of the downstream wetlands as credit in the mitigation plan. In the RROD I have explained my position on how the downstream wetlands would be adversely affected and have indicated that the RRWSG is not willing to preserve the downstream areas in perpetuity. I cannot accept preservation as compensation without a protective covenant on the wetlands to be preserved in perpetuity. This is consistent with current Norfolk District practice for all wetland mitigation sites. In addition, indirect impacts would occur to the downstream wetlands. The applicant has received appropriate compensation credit for every proposed wetland mitigation site they have agreed to preserve in perpetuity.

In addition, DEQ contends that my staff was unwilling to accept wetland preservation as mitigation. However, my staff noted that during a Mitigation Team meeting, DEQ staff informed the applicant that the DEQ permit required 2 to 1 creation/restoration of wetlands, and any deviation in the mitigation plan (including the use of wetland preservation) would require a modification to the DEQ permit. The applicant opted not to pursue preservation to offset any shortfalls in the 2 to 1 acreage compensation requirement in order to avoid the DEQ permit modification process. In the past my staff has accepted preservation as compensation at high ratios in cases where a demonstrable threat to the preservation area is shown, and where the applicant has proposed to preserve these areas in perpetuity. This decision to accept preservation as mitigation is on a case-by-case basis and typically my staff requests at least 1 to 1 restoration or creation in conjunction with the preservation to avoid a net loss of wetlands. In all cases, the District's current practice requires that any preservation areas that are part of a Corps-approved wetland compensation plan must be preserved in perpetuity.

The City of Newport News also claimed that they offered to preserve uplands without receiving wetland mitigation credit for those areas. The upland buffer areas surrounding the proposed reservoir and some of the mitigation sites were given habitat credit under HEP, and credit in the nutrient/sediment retention functional assessments. The upland areas were not given wetland mitigation credit because the District does not generally approve compensation for wetland impacts through preservation of uplands as a net loss of wetland functions would occur.

The applicant claimed that the mitigation plan was criticized for not draining to the same river watershed that would be impacted. The District does not find fault with the mitigation plan for including sites in the Rappahannock River drainage. The District did approve but did not direct a search in the Rappahannock River drainage area after the applicant indicated that all potential sites within the Mattaponi and Pamunkey watersheds had been exhausted. The RROD includes statements made by other Federal agencies that may have been more critical of mitigation in the Rappahannock for impacts in the Pamunkey.

The City of Newport News referenced the Jones and Boyd (2000) paper indicating that a 1.7 to 1 ratio for mitigation was determined by the District to meet the goal of no net loss. Jones and Boyd cited the 1.7 to 1 ratio as an average for all projects within the State, other than VDOT, including both General and Individual permits for a three year period. The mitigation requirements of General and Individual permits may be different, as general permits are not bound by the 1 to 1 functional replacement goal of the 1990

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EPA/Corps MOA. Furthermore, they individually authorize substantially smaller wetland impacts where wetland compensation acreage has generally been considered an acceptable surrogate for functional replacement. The average wetland acreage replacement ratio cited in Jones and Boyd (2000) cannot be compared to the 1 to 1 functional replacement standard required for the King William Reservoir. The District concluded that the RRWSG's mitigation plan would provide replacement on an acreage basis if all the sites were completely successful. However, my staff questioned whether all of the sites would remain feasible and capable of supporting the acreage figures supplied based on the designs in the Final Mitigation Plan. Modifications to the designs may yield less acreage, but would likely increase the chances of success.

The City of Newport News pointed out that the majority of the mitigation sites would actually be restoration instead of creation because of the presence of hydric soils. Newport News also believes that my staff advocated higher ratios because the District believed the work was creation and not restoration. Mitigation by creation is more risky and has more unknown variables than restoration, however, my staff was not advocating higher ratios for this reason. Many parts of the applicant's proposed mitigation sites do have hydric soils, but a large amount of those areas would be excavated. The design plans call for excavation of up to five feet in some areas. Sites with hydric soils could potentially be designed as restoration rather than creation if the mitigation designs called for less excavation. Darke *et al.* (2001) indicated that to maximize wetland acreage, the plans show grading cuts that would create steep slopes along wetland margins. Darke *et al.* (2001) also commented on the overuse of berms that would isolate the sites from nearby streams and existing wetlands. I concur with their concerns that many of the sites would have questionable success.

The City of Newport News indicated that Kruczynski's conclusion that a 1 to 1 ratio is also appropriate for wetland creation is counter to the position of the RROD. Kruczynski states "If successful creation (i.e., similar value between created and natural wetland) is performed up-front of proposed filling, then the ratio can be reduced to 1 to 1." In cases where a low quality wetland area is being replaced with a higher quality area, 1 to 1 replacement may be appropriate; however, there is no justification for lowering the ratios when attempting to replace the lost functions of a high quality system, such as the Cohoke Creek wetlands, with wetlands that would not have the same functions. There is always risk involved with mitigation and even a higher risk with creation versus restoration. The applicant may believe that there is little risk, but they cannot demonstrate how successful the mitigated areas would be or that the created/restored wetlands would provide 1 to 1 functional replacement of lost wetland functions.

The City of Newport News commented that the District noted there were significant changes in the compensation acreage in the Final Plan that were not approved by the agencies and the District. On page 92 of the RROD that point was made; however, it was referring to the February 1999 Final Revised Draft Mitigation Plan. The riskier sites were removed before the February 1999 Plan, but the acreage on some of the sites had increased. In the Final Plan, the acreage was reduced, but design changes to the plans had occurred. The RROD does not state that "unapproved" acreage was added to the Final Plan.

The City of Newport News commented that all aspects of a final design plan should not have been required for the Taliaferro and Terrell sites to be accepted. The RROD indicated on Page 94 that concerns were raised by EPA and the Service on the plans for these sites and that those concerns were not addressed in the Final Plan. The Service and EPA felt that the same design flaws that were present in the preliminary design plans for the Taliaferro and Terrell sites were present in the Final Mitigation Plan. My staff was unable to determine that those sites would provide viable mitigation with the design plans that

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were submitted. In reference to the Terrell site, Darke *et al.* (2001) stated “Without site-specific water table data, it is impossible to predict whether a suitable wetland hydrology can be established at this site.”

The City of Newport News considers the District’s statement that the plan may fall short by 437 acres as an exaggerated and unsupported claim and referenced the Townsend site acreage that was previously agreed upon. My statement in the RROD is that the plan may fall short because of some unknowns. As indicated in the RROD, the District recently became aware that the Townsend site is located within a National Historic Landmark. This determination could have implications on the mitigation plan for that site, regardless of any agreed upon acreage figure. The potential problems with the Terrell and Taliaferro sites have been discussed. In addition, other concerns with the mitigation design plans have been noted in Section 8 f. (2)(e)(ix.) of the Final RROD. Darke *et al.* estimated that with a minimal engineering approach, wetland restoration could be completed on approximately 537 acres of the sites that contain hydric soils, but not on the 235 acres without hydric soils.

The City of Newport News also contends that the District should not have commented on the feasibility of the Bleak Hill/Ferry Farm site just because it has already been proposed as a commercial mitigation bank by others. Malcolm Pirnie, Inc. also questioned the District’s statements about the Bleak Hill/Ferry Farm site being used as a mitigation bank. Malcolm Pirnie staff indicated that it would be beneficial to the project even as a commercial bank site. Malcolm Pirnie stated that the District should not comment on what the applicant can and cannot afford. The District was not attempting to comment on the applicant’s ability to afford to purchase the site or bank credits, rather the document merely questioned whether the site would be available for mitigation for the reservoir project once it was a commercial bank. If for whatever reason, the site is not available, other appropriate and acceptable mitigation would have to be found.

DEQ commented that the District allows the use of mitigation banks for impoundments and stormwater detention ponds that impact riparian wetlands. Every project is reviewed on its individual merit, so a mitigation plan is custom fit to each project. The District can determine that the use of a mitigation bank is not appropriate if wetland functions at the impact site would not be adequately replaced by wetlands in the mitigation bank. In addition, stream and riparian buffer compensation has become a regular component of mitigation compensation when deemed necessary. In-kind compensation for stream and riparian buffer impacts has been requested by the District for other projects.

The City of Newport News also commented that the District did not attempt to address concerns through permit conditions. In the event that a permit is issued for this project, some of the concerns could be addressed through permit conditions. However, changes to the plan would need to be made to address other issues. Several concerns with the current plan could not be addressed by permit conditions, because the mitigation plan does not replace the functions of the wetlands in the impact area.

The City of Newport News questioned the ability of the regulatory program to weigh environmental losses against socioeconomic benefits and overall public welfare, and stated their belief that regulators are not equipped to meet this challenge. The public interest review process weighs a number of factors, not only socioeconomic issues; and balances the project benefits against its reasonably foreseeable detriments. My staff is comprised of an interdisciplinary team of degreed and certified professionals with years of training and experience in evaluating permit applications for a wide variety of projects, most of which involve consideration of environmental losses and socioeconomic benefits.

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The City of Newport News believes that the RROD accentuated the negative aspects of the mitigation plan just to support the decision to deny. As I have stated previously, my staff would have had the same concerns about the plan whether I had decided to issue or recommend denial of a permit.

City of Newport News Mayor Joe Frank commented on what he saw as a trivial approach to critiquing the proposed mitigation plan. My staff devoted many hours to their review of the various mitigation plans, and in individual site inspections. During their participation in the mitigation team effort, my staff pointed out problematic aspects of the plan, and commented on fatal flaws that would eliminate sites from further consideration. Throughout this review, my staff has expressed continued concern about whether the mitigation sites identified by the applicant would provide functional replacement for proposed wetland impacts (see page 71 of the RROD).

Newport News Assistant City Manager Randy Hildebrandt commented on the use of the fringe wetlands as mitigation and expressed concern about perceived inconsistency between Corps Districts in light of a recently permitted reservoir project in the Wilmington District. From the beginning, my staff indicated that the fringe wetlands would not be acceptable mitigation as wetland compensation for reasons already outlined in the RROD (see (vi.) on page 90 of the RROD). The project Mr. Hildebrandt referred to in the Wilmington District was a reservoir expansion, not a new reservoir. Mitigation for flooding of the fringe wetlands that had become established around the reservoir was not required as the Wilmington District expected that a new lacustrine wetland fringe would replace the loss of the existing lacustrine wetland fringe (i.e., the compensation was considered in-kind). The project did not involve compensating for forested stream corridor impacts through development of a lake fringe. As these two projects are totally dissimilar, there can be no inconsistency in how the fringe wetlands were considered.

Governor Gilmore indicated that the wetlands of Cohoke Creek were not listed as important or scarce in a 1990 report entitled "Regional Wetlands Concept Plan" by the Service and are, therefore, not valuable. This has no relevance to whether impacts to the Cohoke Creek wetlands are justified. The fact that the Cohoke Creek wetlands do not appear on a list in the 1990 report does not negate the value of that wetland system. Both EPA and the U. S. Fish and Wildlife Service have asserted that these wetlands qualify as an Aquatic Resource of National Importance (ARNI).

The Governor indicated that the habitat functions of Cohoke Creek had been quantified to ensure that the proposed mitigation successfully replaced lost functions. As stated in the RROD, the purpose of the HEP was to quantify anticipated impacts to the range of habitats existing on the proposed reservoir project site and to determine what would constitute in-kind compensation for habitat impacts. It was also used to determine whether the proposed compensatory mitigation for the reservoir would offset anticipated habitat impacts as well as to identify general types of compensation required to offset habitat impacts. However, most of the mitigation sites were identified and designed by the applicant prior to finalizing the HEP and other functional assessments. Furthermore, many of these assessments clearly demonstrate the applicant's wetland mitigation proposal falls short of the 1 to 1 functional replacement goal.

DEQ indicated that the wetland fringe would naturally form due to restraints on water withdrawal. Although the District does agree some wetland fringe will likely develop, neither the applicant nor DEQ has demonstrated that the fringe wetlands would be persistent or would not be adversely affected by drawdown times. In addition, emergent fringe wetlands would not compensate for the loss of functions of the forested riverine system of the Cohoke Creek.

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Dr. Bruce Schwenneker of Malcolm Pirnie, Inc., criticized a paper entitled "Evaluation of the Effectiveness of Within Watershed Compensation in Response to Permitted Activities Through the Norfolk District Section 404 Regulatory Program" published in 2000 by Jones and Boyd. Based on the findings in that paper Dr. Schwenneker asserts that the District is holding the RRWSG "...to a higher standard for its compensatory mitigation than other applicants." This position is a misinterpretation of the data and conclusions presented in that paper. First, most of the projects permitted during the three-year study period were permitted pursuant to the Corps Nationwide Permit Program which was in place at that time. Of the 1692 permitted projects, 885 did not require mitigation since the impacts associated with those projects were determined to be individually and cumulatively minimal, and fell below compensatory mitigation thresholds established by the Nationwide Permit program and the District's mitigation policy (i.e., less than ½ acre headwater or isolated non-tidal wetland impacts under Nationwide Permit 26). Projects impacting more than ½ acre generally required 2 to 1 mitigation since impacts were determined to be more than minimal. Although not presented in the paper, the average size of wetland impacts in acres versus the average size of mitigation in acres for the calendar years of 1996, 1997 and 1998 was 0.74 vs. 6.26, 0.46 vs. 6.05 and 0.37 vs. 3.28, respectively. It should be noted that these wetland impacts are several orders of magnitude smaller than the wetland impacts proposed for the King William Reservoir.

Dr. Schwenneker asserts that 65 percent of the projects utilized preservation as mitigation. As reported in the paper, 84 of 407 projects (20 percent) utilized preservation as a component of required compensatory mitigation. In the vast majority of the cases (>95%), preservation was only accepted as an appropriate form of mitigation after the permittee accomplished a minimum of 1to1 restoration or creation, either onsite, offsite, through purchase of credits from a mitigation bank or by an appropriate contribution to an in-lieu fee trust fund.

During the three-year study period, 1,692 projects were permitted impacting a total of 863.81 acres, equating to an average of ½ acre of impact per project. During the study period, only 4 projects were permitted authorizing impacts to greater than 10 acres of jurisdictional areas, the highest being 27.14 acres. Proposed impacts to 437 acres of jurisdictional area for the King William Reservoir represents over a 16-fold increase in impacts above the highest permitted project by the District during the study period. More importantly though, is the landscape setting of the permitted impacts in calendar years 96, 97 and 98 as compared to the King William Reservoir project. Those projects were located throughout the state of Virginia and were situated in literally hundreds of different aquatic systems, many of which were not directly associated with free-flowing streams. With an average impact of approximately ½ acre, most aquatic systems were only minimally affected by small incremental impacts as compared to the proposed elimination of 403 acres of contiguous vegetated wetlands and over 21 miles of continuous free-flowing stream within the Cohoke Creek system.

For those projects permitted by individual permits, EPA's section 404 (b)(1) guidelines are applicable along with the Corps and EPA Memorandum of Agreement of 1990 which establishes mitigation guidelines and requirements. The Nationwide Permit Program is not subject to these standards on an individual project basis as compared to individual permits.

One commenter, Joseph A. Landrum, P.E., indicated that the proposed mitigation sites would either be developed or would remain as agricultural fields if they were not converted to mitigation. It is impossible to foresee or to predict the future land use for the existing farm fields. The Commonwealth of Virginia and the Chesapeake Bay Program have several initiatives to restore former wetlands and riparian areas in

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the Bay watershed back to their preexisting conditions. One of the mitigation sites already has been proposed for a commercial mitigation bank. Mr. Landrum also commented that the area around Cohoke Creek could be developed even if the reservoir was not constructed. While development in the Cohoke Creek project area is possible, the steep slopes down to the wetlands would discourage wetland impacts in those areas. Wetland impacts from any future proposed development in the current project area would require review and permits from the District.

A report entitled "Evaluation of the King William Reservoir Final Wetland Mitigation Plan" was completed in 2001 by experts in the field of wetland science, Arlene Darke, W. Lee Daniels, Patrick Megonigal and Richard Whittecar, under contract to the Chesapeake Bay Foundation (CBF). CBF concurred with the findings in the report and in particular noted that the proposed mitigation would not replace the functions of the Cohoke Creek wetlands that would be lost due to the reservoir project. The Southern Environmental Law Center also concurred with the findings in this report and stated the mitigation plan was unacceptable. Darke *et al.* (2001) concluded the functions of the existing Cohoke Creek wetlands would not be replaced by the proposed wetland compensation plan, which consisted of depressional wetlands that lacked connectivity to riverine systems. The report agreed that wetlands could be restored or created at the proposed mitigation sites, and they acknowledged the presence of hydric soils and man-made ditches as being positive aspects of the plan. However, they questioned the water budgets due to the lack of site specific hydrology data. Darke *et al.* (2001) also concluded, that the engineering concepts were largely over-designed and unsuitable for creation of the target wetland types. Overall, they felt that the proposed designs would create areas that would be too wet to support palustrine forested wetlands and would more likely develop mostly emergent wetlands. Darke *et al.* (2001) pointed out that the created wetlands would have basin shapes, little connectivity to nearby streams, and an overland surface flow or direct precipitation source of water, whereas the Cohoke wetlands have a variety of landscape settings, are closely connected to flowing waters and experience over-bank flooding. They noted "...the reduced level of water and nutrient exchange between the mitigation wetlands and adjacent streams would result in the development of systems that were more closed than those they were designed to replace."

In their comments on the RROD, EPA and the U. S. Fish and Wildlife Service reiterated their concern that the applicant's proposed mitigation plan would not compensate for the losses of wetland functions. Also, Langhei Ecology indicated that the only possible way to mitigate for the losses would be to restore an entire watershed.

g. Endangered or Threatened Species: Impacts to three federally listed threatened species; the small whorled pogonia (*Isotria medeoloides*), the sensitive joint-vetch (*Aeschynomene virginica*), and the bald eagle (*Haliaeetus leucocephalus*) were evaluated for this project. Informal consultation with the U.S. Fish and Wildlife Service led the District to determine that formal consultation would not be required for the bald eagle but would be required for the small whorled pogonia and the sensitive joint-vetch pursuant to Section 7(a)(2) of the Endangered Species Act. It should be noted that the level of protection and the need for consultation for federally listed threatened species is the same as for federally listed endangered species under Section 7 of the Endangered Species Act. On 2 February 1998, the District initiated formal consultation with the Service and the Service's Biological Opinion was finalized on 18 September 1998.

The Service concluded that neither the proposed action nor its cumulative effects are likely to jeopardize the continued existence of the small whorled pogonia or sensitive joint-vetch species. However, a "no

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jeopardy” opinion does not mean that the proposed work will not affect listed species. Rather, it means that this one action alone would not lead to the extinction of the entire species being considered, even though there may be harm, functional impairment or destruction of an individual population. No critical habitat has been designated for these species, so none would be impacted. (For a detailed discussion of endangered species issues, see the District’s report entitled “Endangered Species Consultation for King William Reservoir Project.”)

(1) Bald Eagle: The bald eagle is protected under the 1940 Bald and Golden Eagle Protection Act. This species was federally listed as endangered in 1967, but was reclassified to threatened in 1995. The 6 July 1999 proposal to delist the bald eagle is controversial in the Chesapeake Bay population due to heavy development pressure in the region that threatens their habitat; therefore, delisting has not taken place. The bald eagle is currently listed as threatened in Virginia. Bald eagles are particularly sensitive to noise and other disturbances from human activities, especially during nesting and foraging.

A bald eagle nest is located approximately 10,100 feet (1.9 miles) downstream of the KWR-IV dam construction site. The pipeline from the KWR-IV dam to the existing Diascund Reservoir would be more than 0.5 miles from the nest. Another bald eagle nest has been documented on the Mattaponi River approximately 1,800 feet (0.3 miles) from the proposed intake location at Scotland Landing. These nests are beyond the designated 0.25-mile radius buffer (1,320 feet) within which human activities could disturb eagles or degrade their habitat; therefore, the Service concluded that if noise disturbances are not excessive, the proposed reservoir construction would not be likely to adversely affect the bald eagle at the King William Reservoir Site.

During informal consultation for endangered species under Section 7 of the Endangered Species Act, discussions over management issues for the bald eagle took place between the applicant, the District and the Service. In a 28 March 1996 letter, the Service recommended tight control of sedimentation during construction to avoid interference with foraging success of the eagle. Another nest is located near Chestnut Grove Landing, approximately 0.25 miles west of the pipeline to Diascund Reservoir. In a 25 July 1997 letter, the Service recommended time-of-year restrictions from 15 November through 15 July on pipeline construction activities to prevent disruption to bald eagles during the critical nesting period. Also, if active eagle nests are located in the vicinity of any of the proposed wetland mitigation areas, additional coordination would be necessary. The Virginia Department of Game and Inland Fisheries also recommended the same time of year restriction and recommended that all nests should be protected by a management zone of 750 feet since disturbances during this period may lead to nest abandonment and/or chilled or overheated eggs or young, or premature fledging. The VDGIF also stated that no human activity or habitat alteration, including construction, should occur in this zone during the nesting season from 15 November through 15 July and that all of the forested reservoir shoreline should be protected by a management zone that extends at least 330 feet inland and prohibits clearcutting, land clearing and construction. A management zone and its governing rules should be established in cooperation with the VDGIF and the U. S. Fish and Wildlife Service.

In the informal consultation process, the Service provided recommendations to minimize potential impacts to both existing and newly established eagle nests that could occur during construction and operation of the pipeline and reservoir. The applicant agreed to these recommendations and they were included in their proposed management plan contained in the District’s January 1998 Biological Assessment. Although the bald eagle was included in the District’s letter initiating formal consultation, the Service stated in their letter of 27 February 1998 that their concerns over potential impacts to bald

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eagles had been resolved through the informal consultation process. Therefore, the bald eagle did not need to be included in the formal consultation. However, there is no mention of these management measures in the RRWSG's October 1999 Mitigation Program, Fish and Wildlife Mitigation Plan. I concur with the management measures recommended by the Service and VDGIF and agree that the recommendations should be incorporated as conditions if a Corps permit were issued for the project.

In their comments on the RROD, the City of Newport News indicated that they are not opposed to the recommendations for bald eagle management outlined in the EIS and the Biological Assessment and they had assumed that the management strategies would be incorporated as permit conditions. If I were to issue a permit for this project, I would include these management measures as permit conditions.

(2) Small Whorled Pogonia: The small whorled pogonia was federally listed as endangered in 1982, but reclassified from endangered to threatened in 1994. This orchid is also listed as a state endangered species in Virginia. The small whorled pogonia was found in two locations within the pool area of the proposed King William Reservoir. Both locations would be flooded by the currently proposed King William Reservoir. However, as recent clearcutting and burning has rendered the habitat at Colony 1 unsuitable for the pogonia, it is considered no longer extant at that location. Colony 2 is located at approximately 64 feet mean sea level and would be inundated at the normal pool elevation of 96 feet mean sea level. Because Colony 2 would be flooded and destroyed, the Service concluded that direct impacts would occur to the small whorled pogonia.

As reported in the RRWSG's Mitigation Program, Fish and Wildlife Mitigation Plan, one colony was present in 1995, but not in 1996. The applicant claims that the project would have no impacts on the small whorled pogonia because only one individual of Colony 2 was observed in 1997 and none have been observed since that time. This claim was reiterated in the applicant's Environmental Issues Summary, based on one site visit by Malcolm Pirnie staff in late June 1999. A July 2000 survey conducted by the applicant also reported no observed plants in the colony. The applicant believes that the site has no long-term viability because beaver activity 2 to 3 years ago opened the forest canopy and altered the site's suitability to support the small whorled pogonia.

It cannot be assumed that because small whorled pogonia plants were not found in a location, they would never be present there again. Small whorled pogonia plants can occur one year and not be found the next. Colony size and stem counts can fluctuate widely on an annual basis because individual plants may not emerge every year, but may lie dormant for up to seven years. The U. S. Fish and Wildlife Service commented that Colony 2 "...is particularly interesting due to their larger than normal size and their reproductive status. Plants that have twin flowers are considered to be particularly well-established and to have a strong energy source." Therefore, it should not be automatically assumed that Colony 2 no longer exists.

As mitigation for the adverse effects to the species, the applicant offered to relocate the affected small whorled pogonia plants to a protected site. Experience has shown the Service, and the Virginia Department of Conservation and Recreation Division of Natural Heritage that individuals of the species do not survive transplanting; therefore, mitigation usually entails the purchase and preservation of property that contains known populations of the species that are under threat of destruction from development. The Service's conservation recommendation to minimize the impacts of the proposed action on the small whorled pogonia was the perpetual preservation of the Casey Colony in James City County. Monitoring and site management would be a component of the preservation plan.

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Although the applicant considers the habitat at the Colony 2 to be marginal, they have agreed to the Service's conservation recommendation. Dr. Donna Ware of the College of William and Mary has identified several sites with known populations and suitable habitat for the small whorled pogonia as candidates for preservation (White Marsh Colony in Gloucester County, the Casey/Ford's Colony site in James City County and a remnant of the Grimes Colony in James City County). The applicant's plan would be to attempt to secure the Casey Property/Ford's Colony Site in James City County to preserve the small whorled pogonia population that is under threat from land development. However, if that site is not available, purchase of the other sites with pogonia colonies would be attempted. Although they claim there would be no plants to move, an attempt to relocate plants that would be affected by the reservoir to suitable locations remains a part of the applicant's plan.

(3) Sensitive Joint-Vetch: The sensitive joint-vetch was federally listed as threatened in 1992 and is listed as very rare and imperiled in Virginia. A large population of the sensitive joint-vetch has been recorded in five areas along a 15-mile stretch of the Mattaponi River between Walkerton (river mile 28) and the Wakema/Gleason Marsh (river mile 13) in the tidal freshwater (0.0 to 0.5 ppt salinity) and oligohaline (0.5 to 5.0 ppt salinity) portions of the River. The Melrose Landing population is located within the oligohaline salinity regime near its boundary with the mesohaline (5 to 18 ppt) regime. Populations of this species are located on the north side of the Mattaponi River within the Garnetts Creek Marsh directly across from the proposed intake site at Scotland Landing (approximately 2.5 acres of habitat), and in a small pocket marsh on the south side of the river downstream of White Oak Landing, approximately 600 feet upstream of the intake site. The Garnetts Creek Marsh is classified by the Virginia Department of Conservation and Recreation Division of Natural Heritage as an exemplary freshwater tidal marsh and is ranked as an excellent occurrence of this community type. Historically, seven populations had been recorded on the river, however, no plants have been found at the Wakema site and at one of the two Melrose Landing sites in recent years.

In a February 2000 report entitled "Population Monitoring and Habitat Characterization Study of *Aeschynomene virginica* (Sensitive Joint-Vetch), 1998 and 1999 Field Seasons Mattaponi River System, Virginia" conducted by Garrie Rouse of Rouse Environmental Services, Inc., prepared for the Virginia Department of Agriculture and Consumer Services, the two populations at Gleason Marsh/Melrose Landing were noted to be suffering from predation and potentially increased salinities due to reduced freshwater inputs from upstream sources during drought conditions. Rouse indicated that the downstream populations at Melrose Landing-Site B and Gleason Marsh Island could be at risk due to low recruitment. Rouse expressed concern for losing these downstream populations, since that loss would affect the once secure position of sensitive joint-vetch on the Mattaponi River. Loss of the downstream populations would mean a decline from the historical number of seven populations to three populations and a reduction in the range from a 15-mile segment of the river to a 5-mile segment of the river. It appears unlikely that if plants were lost in one location, the population would shift to another area, due the plant's limited mechanisms for seed dispersal and a requirement for a very specific ecological niche. As the downstream populations already appear to suffer from increased salinities especially during summer and fall drought conditions when freshwater flows are low, additional stresses to these downstream populations could be the factor that eliminates their presence.

The Service concluded that no direct impacts to the sensitive joint-vetch are anticipated from the construction and operation of the proposed intake structure, pier and boathouse at Scotland Landing. However, indirect impacts associated with the withdrawal of freshwater from the Mattaponi River may occur to all locations of the species on the River through changes in salinity and water quality. Also, the

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beds closest to the intake could be indirectly impacted by erosion or accretion of the point-bar habitats on the shoreline.

The sensitive joint-vetch is also found at five locations in the tidal freshwater and oligohaline zones of the Pamunkey River along a 19-mile section from Holts Creek/Cumberland Marsh to Clayborne Creek Marsh. As the Mattaponi and Pamunkey Rivers converge to form the York River, potential salinity changes from freshwater withdrawals in one tributary have the potential to affect salinity levels in the other tributary. Therefore, the Service concluded that the “action area” for the sensitive joint-vetch would include the tidal freshwater zones of both rivers. Consequently, the Service expressed concern about the potential effects of salinity and water quality changes not only to the colonies near the proposed intake, but also to populations downstream of the intake as well as throughout the York River basin, and made six conservation recommendations to minimize or avoid adverse effect of the proposed action on populations of the sensitive joint-vetch.

The Service’s priority recommendation for protection of the sensitive joint-vetch population in the York River system was the maintenance of natural variability by placing minimum instream flow restrictions on raw water withdrawal from the Mattaponi River. The Service does not believe that the RRWSG’s proposed minimum flow of 40%/20% of Mean Annual Flow would have enough linkage to biological processes and historic flow regimes to maintain natural variability. Since so little is known about the exact habitat requirements and ecological niche of the sensitive joint-vetch, it is not known if variations from normal conditions during the months of early spring may be critical to its growth process. The life cycles of many riparian plants have adapted to the seasonal timing of the natural flow regimes through the sequence of flowering, seed dispersal, germination and seedling growth. Seasonal timing is particularly important to annual plants like the sensitive joint-vetch, that have to reestablish their populations every year. The Service feels that it is critical to closely follow the natural regime as much as possible and recommended using the more conservative modified 80% Exceedence MIF to reduce or eliminate impacts to the sensitive joint-vetch colonies near the intake and farther downstream. This would be consistent with recommendations of the Virginia Department of Game and Inland Fisheries and one of the conditions of the Virginia Department of Environmental Quality’s (DEQ) Water Quality Certification/Water Protection Permit which stipulates a Mattaponi River flowby regime of 80% exceedence of each month’s flow duration statistics.

However, the applicant believes that there would be a nearly undetectable difference between the 40/20 Tennant Minimum Instream Flow and natural variation in the river system and is opposed to the use of the Modified 80% Exceedence MIF because it would minimize opportunities for filling the reservoir during periods of high flows. Immediately after the DEQ permit was issued, the applicant brought suit against the SWCB to challenge this condition and has indicated to the District that such a restriction would not provide enough water to make the project economically feasible. However, when the Court dismissed the City of Newport News’ appeal, finding that the State Water Control Board had not abused its authority, the City did not appeal the decision. Rather, they indicated that they would request a modification of the DEQ permit when it is due for re-issuance in 10 years. Based on my concerns for potential impacts to sensitive joint-vetch colonies as well as a number of other concerns outlined elsewhere in this document, I have determined that flow-bys based on the Modified 80% Exceedence for the withdrawal rules in the Mattaponi River must be required if a Corps permit were issued (see Section 8 e. (1)(a)).

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As a part of the Mattaponi River Monitoring Plan that the District has developed in conjunction with the multi-agency team, the Service recommended investigating the impacts of the withdrawal on the sensitive joint-vetch during the reservoir-filling phase as a worst-case situation. They stated that if the District's required River Monitoring Plan reveals impacts from the water withdrawal or intake structure, they would consult the District and the Service to determine appropriate strategies for remedying the impact. Formal consultation under Section 7 of the Endangered Species Act was being undertaken simultaneously with the development of monitoring conditions; therefore, the development of monitoring protocols for the sensitive joint-vetch by the monitoring team would have been premature. Further discussions would have to be undertaken with the Service to determine appropriate monitoring protocols.

The Service also recommended annual monitoring of all extant and historical populations of sensitive joint-vetch on the Mattaponi River and Pamunkey River for a ten-year period. The applicant did not agree to monitor all colonies of sensitive joint-vetch but indicated they would monitor what they consider to be a reasonable, but undisclosed, number of colonies. I do not necessarily agree with the Service that all colonies both the Mattaponi and Pamunkey Rivers should be monitored. Further evaluation would be required to determine which colonies should be monitored if a Corps permit were issued for the project.

The Service expressed concern that construction disturbances may bring about the invasion of common reed (*Phragmites australis*) which could affect the marsh community near the intake and indirectly threaten the existing sensitive joint-vetch and other suitable habitat. Therefore, the Service recommended strict control of invasive species at the Scotland landing intake site both during and after construction activities. The applicant agreed to this recommendation.

The Service recommended coordination with state and local agencies, to mark the navigation channel to minimize boat wake impacts to the sensitive joint-vetch habitat at Garnetts Creek Marsh, if it becomes necessary. The applicant does not believe that the proposed intake structure would affect river traffic or move it closer to the marsh; nevertheless, they agreed to petition the authorities to provide channel markers to better control boat traffic in the vicinity of the intake.

The Service also recommended land acquisition or conservation easement protection of sensitive joint-vetch habitats at Garnetts Creek Marsh and Gum Marsh and upland buffers in conjunction with the applicant's wetland mitigation plan. The applicant was not amenable to purchasing property or a conservation easement on sensitive joint-vetch colonies unless the District would agree to accept wetland preservation as a priority compensation component of the wetland mitigation instead of wetland creation or restoration. The District and the federal advisory agencies concur that priority should be given to wetland creation and/or restoration with reliance on preservation only as a final option.

In response to the Service's Final Biological Opinion, the RRWSG agreed to three of the six conservation recommendations outlined above. However, in their Mitigation Program, Fish and Wildlife Mitigation Plan, the RRWSG reiterated their belief that the impacts to the sensitive joint-vetch habitat from the construction and operation of the intake at Scotland Landing would be negligible, and offered to locate work staging areas away from wetland areas, implement sediment control measures at all times and avoid compaction and disturbance of wetland soils as steps to "further minimize the potential for adverse effects." As there is no mention of the previous agreement to the Service's conservation recommendations in the mitigation plan, it would appear that the applicant might now be replacing their agreement with these three measures. Such measures to minimize the adverse impacts associated with construction would be automatically included in any Corps permit as special conditions, and the

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implementation of standard erosion and sedimentation controls are required by state and local agencies responsible for ensuring that Best Management Practices are followed. These general measures would not provide protection for the sensitive joint-vetch equal to the Service's recommended measures.

In their comments on the RROD, the City of Newport News indicated that they are not opposed to the recommendations outlined in the Biological Opinion and assumed they would be incorporated as permit conditions. However, the applicant originally agreed to implement only three of the Service's six conservation recommendations. As one of the conservation recommendations, the Service recommended the adoption of the Modified 80% Exceedence flowby method for protection of the sensitive joint-vetch. The RRWSG refused to agree to this conservation recommendation as they intended to request that the MIF stipulated in the VWPP be changed to their proposed 40/20 Tennant MIF method when the permit is re-issued in 2007. In their most recent comments, the City of Newport News stated that since the VWPP already requires that Mattaponi River withdrawals comply with the Modified 80% Monthly Exceedence MIF, this should be the basis of Norfolk District's evaluation of the permit application. However the City has not modified their application to reflect such changes. Therefore, the City's most recent statement that they are not opposed to the conservation recommendations for the sensitive joint-vetch contradicts other statements made in response to the RROD regarding the flow-by requirements for the Mattaponi River. With the exception of the number of colonies to be monitored, I agree with the need to implement all six of the Service's conservation recommendations for the sensitive joint-vetch. I have concluded that without implementation of these recommendations, the construction and operation of the intake has the potential to result in indirect impacts to colonies of sensitive joint-vetch in the vicinity of the intake. If I were to issue a permit for the proposed King William Reservoir, I would include as special conditions all six of the Service's recommended measures as outlined above.

The issuance of the Biological Opinion concluded the Formal Consultation process. However, if federally listed threatened or endangered species are found to be present on or near any of the proposed mitigation sites, or the relocated sections of the pipeline, formal consultation may need to be reinitiated. Also, King William County has indicated that they plan to develop Scotland Landing Park, a recreational park on the remainder of the land purchased for the construction of the intake and pump station. Depending on the type of development, the sensitive joint-vetch population on the south side of the river could be affected by those actions.

(4) Comments Received on the RROD Regarding Endangered or Threatened Species: Comments on impacts to endangered or threatened species were received from the following:

City of Newport News (on behalf of RRWSG), Comments to Norfolk District, U. S. COE
Recommended Record of Decision (RROD): March 20, 2001 and IWR Special Study:
March 1, 2001
James S. Gilmore III, Governor of Virginia
The Nature Conservancy
Thomas C. Rubino
Sierra Club, Virginia Chapter
Southern Environmental Law Center
Virginia Audubon Council, National Audubon Society
The Mattaponi and Pamunkey Rivers Association

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(a) Bald Eagle: The City of Newport News indicated that they are not opposed to the recommendations for bald eagle management outlined in the EIS and the Biological Assessment. They assumed that the management strategies would be incorporated as permit conditions. I have noted these comments in the Final RROD. Both the City of Newport News and Governor Gilmore stated their belief that the King William Reservoir and its wooded buffer would provide an environment more suited to bald eagle nesting than exists under current land use conditions. Governor Gilmore stated that the Department of Game and Inland Fisheries does not anticipate significant adverse impacts to bald eagle nesting as a result of the project. If I were to issue a permit for this project, these management strategies would be included as permit conditions.

As noted on page 105 of the RROD, the applicant's Final Mitigation Program, Fish and Wildlife Mitigation Plan did not mention bald eagle management strategies, therefore, it was not clear whether the City of Newport News still proposed to include them in their plans. The RROD stated that if a Corps permit were issued, the management measures recommended by the Service and the VDGIF should be incorporated as permit conditions. As stated in the RROD, the VDGIF made several recommendations to minimize disturbances to the bald eagle. The Virginia Audubon Council, National Audubon Society expressed concern for the inclusion of management measures for the bald eagle as recommended by the Service and the VDGIF.

(b) Small Whorled Pogonia: In their comments on the RROD, the City of Newport News restated their contention that the habitat for the small whorled pogonia had been so altered by beavers and timbering that the plants would not reoccur. They quoted as evidence of this a statement in the Service's Biological Opinion that "...with 5 mature plants only, this colony lacks any indications of new seedling recruitment and the habitat may currently be suited solely for established plants." The City of Newport News again indicated that they would preserve an existing colony of small whorled pogonia even though they do not agree that the pogonia would be impacted. As the small whorled pogonia is a perennial orchid which can remain dormant for many years, the lack of seed recruitment does not preclude the existence of the mature plants of the colony. The City's agreement to incorporate the Service's conservation recommendations was outlined on page 106 of the RROD.

The City of Newport News restated their belief that no small whorled pogonia plants would be impacted. However, Governor Gilmore, the Southern Environmental Law Center and the Mattaponi and Pamunkey Rivers Association concurred with the RROD that the small whorled pogonia would be impacted by the project.

(c) Sensitive Joint-Vetch: In their comments on the RROD, the City of Newport News indicated that they are not opposed to the recommendations outlined in the Biological Opinion and assumed they would be incorporated as permit conditions. As stated in the RROD, I have concurred with the Service's determination that indirect impacts could occur and I agree that the Service's six conservation recommendations should be included as permit conditions as noted on page 108 of the RROD. However, the applicant originally agreed to implement only three of the Service's six conservation recommendations. As the RRWSG's comprehensive final report made no mention of either the informal or formal Section 7 consultation with the Service or any of the conservation recommendations that resulted from that consultation, it appeared that these recommendations were no longer a part of the RRWSG's plan. Furthermore, the City's most recent statement that they are not opposed to the Service's conservation recommendations contradicts other statements made in response to the RROD regarding the flow-by requirements for the Mattaponi River as outlined in Section 8 e. of the

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Final RROD. If I were to issue a permit for the proposed King William Reservoir, I would include all six of the Service's recommended measures as conditions of the permit.

Governor Gilmore commented that impacts to the federally listed threatened sensitive joint-vetch would be unlikely. He stated various reasons for his belief that the concerns raised over indirect impacts to sensitive joint-vetch populations on the Mattaponi River are not valid including: negligible increases in turbulent energy, small possibility for increased erosion, and the species' tolerance of significant variations in salinity. He outlined the applicant's proposed measures to minimize threats to the sensitive joint-vetch as well their agreement to some of the Service's six conservation recommendations. The Nature Conservancy discussed the possible stresses to the Mattaponi River from the proposed withdrawal and indicated that the changes in timing, duration, and frequency of freshwater flows, increased salinity, and altered sediment patterns were likely to impact the sensitive joint-vetch. The Southern Environmental Law Center, the Sierra Club, the Virginia Audubon Society and the Mattaponi and Pamunkey Rivers Association all expressed concern for potential impacts to sensitive joint-vetch populations. I have agreed that the potential changes in salinity may affect the sensitive joint-vetch and indicated that the Service's conservation recommendations would be implemented as discussed on page 108 of the RROD if I were to issue a permit. Dr. Basco reported that the intake would produce a wake region with increased turbulent kinetic energy that would impact the south-side bank both upstream and downstream of the intake structure. Furthermore, he reported that sharp surfaces and edges of the intake screen would generate increased levels of turbulent energy when the ebb flows pass the screen, transferring turbulence downstream. As stated in the RROD, this increased turbulent energy could reach the sensitive joint-vetch area on the south side of the river, especially during elevated water and flood events.

One commenter, Mr. Tomas Rubino, expressed concern that the downstream populations of sensitive joint-vetch were displaying signs of stress that he attributed to increased salinity in those areas. He said that the populations were fewer in number, smaller in size, produced fewer seeds, and had fewer seeds per pod. Those comments were based on a February 2000 publication entitled "Population Monitoring and Habitat Characterization Study of *Aeschynomene virginica* (Sensitive Joint-Vetch), 1998 and 1999 Field Seasons Mattaponi River System, Virginia" conducted by Garrie Rouse of Rouse Environmental Services, Inc., for the Virginia Department of Agriculture and Consumer Services.

The February 2000 Rouse report noted concern for the downstream populations of plants at Melrose Landing and Gleason Marsh Island. These populations appear to be suffering from predation and potentially increased salinities due to reduced freshwater inputs from upstream sources during drought conditions. For the 1999 season when drought conditions were a problem, Rouse discovered that the downstream populations appeared to be at a higher risk for predation from corn earworm and tobacco budworm. Rouse found higher than normal pore and water surface salinities at sensitive joint-vetch sites during the 1998 and 1999 monitoring seasons. Rouse concluded "Whereas lower than normal freshwater flows in the spring may produce higher numbers of individuals, continued low freshwater input into the summer and fall appear to reduce individual productivity in terms of seed output." It appears unlikely that if plants were lost in one location the population would shift to another area, due the plant's limited mechanisms for seed dispersal and a requirement for a very specific ecological niche. Rouse noted that the downstream population at Melrose Landing-Site A, that had been documented from 1987 through 1993 is probably not persistent. He noted that the downstream populations at Melrose Landing-Site B and Gleason Marsh Island could be at risk due to low recruitment. Rouse expressed concern for losing

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these downstream populations, since that loss would affect the once secure position of sensitive joint-vetch on the Mattaponi River.

Mr. Rubino expressed particular concern over losing the smaller population downstream of the proposed reservoir intake, since it may be more sensitive to changes in salinity. Mr. Rubino indicated that the populations downstream may possess a genetic variation that allows them to live at the plant's upper extremes in salinity tolerance. He expressed concern that if plants were displaced, sensitive joint-vetch would not move upstream as other plants due to their very specific habitat requirements and apparent difficulty in germination. Mr. Rubino also expressed concern that common reed (*Phragmites australis*) may become established during construction of the intake and pump station and then be transferred to other parts of the Mattaponi River, especially the Garnetts Creek population.

I have concluded from the recent Rouse monitoring report that as the downstream populations already appear to suffer from increased salinity levels especially during summer and fall drought conditions when freshwater flows are low, additional stresses to these downstream populations could be the factor that eliminates their presence. This report further supports the Service's opinion that the sensitive joint-vetch could be impacted by the project and confirms my belief that the Services' six conservation recommendations outline on page 108 of the RROD are necessary to protect these populations.

h. Other Rare or Protected Species: According to the Virginia Department of Conservation and Recreation Division of Natural Heritage, in addition to the sensitive joint-vetch, the Mattaponi River supports populations of several rare plants: marsh senna (*Chamaecrista fasciculata* var. *macrocarpa*), small water-wort (*Elatine minima*), Parker's pipewort (*Eriocaulon parkeri*) and tropical water-hyssop (*Bacopa innominata*). Increased salinity levels and changes in water quality from the withdrawal of freshwater could adversely affect these plant species.

The great blue heron would also be adversely affected by the project in two separate locations. Great blue herons are protected under the Migratory Bird Treaty Act, which is enforced by both the U.S. Fish and Wildlife Service and the Virginia Department of Game and Inland Fisheries. The great blue heron carries a state heritage ranking of S3, which means that it is rare to uncommon and may be somewhat vulnerable to extirpation. Loss of habitat, particularly nesting habitat, is considered a threat to the species.

A great blue heron rookery is located within the proposed KWR-IV reservoir pool area north of Route 626. The rapid growth of this rookery from 3 nests in 1993 to 17 nests in 1995 indicates the potential for further expansion. Great blue herons thrive in natural habitats where there is limited predator and human access, nesting primarily in riparian swamps with large trees. Most of the 17 nests were located in dead white oak trees within an open water beaver pond. The rookery would be inundated by the reservoir forcing the breeding individuals to find another area to nest. The Virginia Department of Game and Inland Fisheries stated that the rookery area should be protected from reservoir basin clearing activities, the rookery trees should not be removed, and no construction activities should take place within 0.25 miles of the rookery from March 15 through July 30. The RRWSG has not agreed to incorporate these recommendations into their plans and claims that suitable nesting habitat is likely to be in abundance in nearby watersheds. The U.S. Fish and Wildlife Service disagreed with the RRWSG's unsupported claim and expressed concern that the overall carrying capacity of the region for nesting herons would be reduced by the proposed reservoir.

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In their comments on the RROD, the City of Newport News stated that their September 1997 field investigation of the rookery within the proposed reservoir pool area found only one remnant nest remaining in the area which was in disrepair and looked as if it had not been used for at least one nesting season. They stated that the combined habitat units created by the reservoir and the habitat units provided by the wetland mitigation sites would more than offset the losses in the project area.

The U. S. Fish and Wildlife Service noted disruptions to migratory bird nesting, including great blue herons nesting in the reservoir pool area as one of their continued concerns regarding damaging impacts of the King William Reservoir in their 1 May 2001 comments on the RROD, therefore, I defer to their expertise in this matter. However, as I am unable at this time to confirm the actual number of nests in the rookery, I have deleted reference in the Final RROD to there being 17 nests. The interagency HEP study only evaluated foraging habitat for the great blue heron; therefore, any claims by the City of Newport News regarding the HEP study and compensation for great blue heron nesting habitat are unsubstantiated.

The relocated outfall structure on Beaverdam Creek could also adversely impact a small nesting population of the great blue heron. Disturbances from construction and operation of the outfall and channelization of 150 feet of vegetated wetlands directly beneath the four nests of this great blue heron rookery could force the nesting pairs from the rookery and abandonment would occur. The RRWSG has failed to include any discussion regarding efforts to avoid or minimize these unnecessary and, therefore, unacceptable impacts to the rookery.

The City of Newport News stated that they were unaware of the existence of the small great blue heron rookery in the vicinity of the outfall on Beaverdam Creek and criticized the Corps and the Service for not informing them of the threat to the rookery prior to publication of the RROD. The great blue heron rookery on Beaverdam Creek is clearly visible during leaf-off conditions from the westbound lane of Interstate 64.

The City of Newport News indicated that the outfall structure could be relocated either upstream or downstream of the proposed location, if necessary, to avoid impacts to the rookery. This statement contradicts earlier statements by the RRWSG regarding their unwillingness to relocate the outfall structure further downstream to avoid impacts to wetlands and other aquatic resources. The City indicated that they had already relocated the structure further downstream once, and the estimated cost of \$1.6 million to relocate it further downstream into the main body of Diascund Reservoir would be prohibitive.

Although the City of Newport News does not agree that the potential exists for any impacts to this rookery, they believe that any potential impacts would be more than offset by the RRWSG's mitigation package. The interagency HEP study only evaluated foraging habitat for the great blue heron; therefore, there is no data regarding how the reservoir, reservoir buffer, or any of the proposed wetland mitigation sites might be able to compensate (or not) for impacts to great blue heron nesting habitat. Any claims by the City of Newport News regarding the HEP study and compensation for great blue heron nesting habitat are unsubstantiated.

i. Other Wildlife: Approximately 1,526 acres of wildlife habitat within KWR-IV pool area would be converted to open water. Terrestrial and wetland-dependent wildlife would be affected by the inundation of wetland and forested areas. Many species inhabiting the flooded area would be forced to relocate to other areas of similar habitat, if available. If neighboring habitats are at or near their carrying

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capacity for a particular species, the competition for available food supply would result in malnutrition and mortality and an overall reduction of the population of that species in the area. Less mobile species and species dependent on large contiguous habitats would be the most affected by the reservoir construction. Reptiles, amphibians and some small mammals would be less likely to relocate unless suitable habitat is available immediately adjacent to the pool area. These individuals would not survive.

An aquatic fringe would most likely become established around the reservoir; however, the fringe would not provide the same diversity of habitat as that present in the existing Cohoke Creek system. Furthermore, water level fluctuations and periodic drawdowns associated with reservoir operation would decrease the habitat value and use of the aquatic fringe by wildlife. Reduction in habitat could also affect temporary resident species such as neotropical migratory songbirds that rely on large areas of temperate forest for breeding. Reduced habitat from forest fragmentation could result in decreased breeding success and an overall population reduction. Species currently utilizing palustrine wetlands would be adversely affected since much of their food sources would be destroyed by the removal and flooding of the vegetation.

Clearing of forests along the pipeline route would result in fragmentation of habitat for some interior forest species. The cleared right-of-way could also allow the introduction of edge species, which compete with, or prey upon interior forest species.

j. Anadromous Fish and Other Fishes:

(1) Mattaponi River: Fish collection records for the Mattaponi River between 1993 and 1995 identified 13 fish species including five species of anadromous fish. Anadromous fish species documented as utilizing the tidal freshwater reaches of the Mattaponi River for spawning and nursery grounds are the American shad (*Alosa sapidissima*), Hickory shad (*Alosa mediocris*), Alewife (*Alosa pseudoharengus*), and Blueback Herring (*Alosa aestivalis*). Semi anadromous species include white perch (*Morone americana*) and yellow perch (*Perca flavescens*).

Over-fishing and the construction of impediments to upstream migration have resulted in a decline in anadromous fish in all Virginia rivers. The reproductive viability of American shad is of particular concern because shad populations have slowly but steadily declined over the past 100 years. State and federal agencies are currently involved in conservation efforts to restore habitat and increase American shad populations. Hatcheries operated by the Mattaponi and Pamunkey Tribes on their reservations contribute to this effort. Based on recent unpublished data, anadromous fish populations in the Mattaponi River presently appear to be relatively high compared to other Virginia rivers, although still low by historical standards. Recent surveys also indicate that shad populations in the York and Rappahannock Rivers have stabilized most likely due to the fishing moratorium. However, traditional fisheries management has not been effective in expanding the shad populations, and researchers have acknowledged that the complex interactions of the complete ecosystem must be taken into account. Therefore, new studies at the Virginia Institute of Marine Science are underway to examine the critical stages of the shad's life cycle and to determine what types of habitat are essential to reproductive success.

The taking of shad in the rivers is prohibited to the general public due to depletion of stocks by over-fishing and habitat degradation. However, the Mattaponi and Pamunkey Tribes hold tribal fishery rights and are exempt from the state closure. Many members of the Mattaponi Tribe depend on fish from the Mattaponi River for both their subsistence and as a source of income, and the Tribe operates a shad

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hatchery to restore and replenish shad populations in the River. The Mattaponi Tribe's shad hatchery contributes from 6 to 10 million shad fry every year to Virginia's waters.

On behalf of the Mattaponi Tribe, the Institute for Public Representation (IPR) submitted letters dated 25 July 1997 and 14 January 2000 outlining the Tribe's concern that the proposed withdrawal of up to 75 mgd of freshwater from the Mattaponi River could result in significant adverse impacts to American shad and related fish species. IPR's 14 January 2000 letter included letter reports, dated 17 December 1999 and 12 January 2000, from Dr. Edward F. Cheslak, an aquatic ecologist, commenting on the potential adverse effects of the project on anadromous fishes in the Mattaponi River. In these letters, IPR and Dr. Cheslak expressed concern that the upstream intrusion of brackish water into the tidal freshwater reaches of the Mattaponi River along with changes to hydrologic patterns and tidal dynamics would adversely affect American shad habitat, disrupt spawning behavior and affect the viability of eggs and the survivability of larvae and juveniles. Also, the letters expressed concern that the withdrawal of so much water might increase water temperatures and reduce oxygen levels in the summer resulting in adverse effects to shad and herring nursery areas. Since the intake facility would be located within the prime spawning area for shad and other anadromous fish, there is concern that the intake would harm fish eggs and juveniles, remove the fishes' food supply and concentrate predatory fish. In addition, noise from the operation of the pumping station could disrupt fish migration and spawning habits. Turbulence and increased siltation from periodic backflushing to clean the intake pipe could further threaten the fish. If the project is approved, the Mattaponi Tribe has requested that no withdrawals be allowed during the critical spring shad spawning period to provide protection for the more vulnerable eggs and juveniles.

The U. S. Fish and Wildlife Service has expressed concern that the potential of saltwater intrusion to decrease the tidal freshwater zone of spawning habitat on the Pamunkey and Mattaponi Rivers could seriously impact populations of American shad and striped bass. In their 28 March 1996 letter, the Service commented, "Virginia and CBP's (Chesapeake Bay Program) successes in opening historic habitat to reverse dramatic declines in shad and striped bass populations should not be negated by the reduction in available tidal freshwater habitat from RRWSG water withdrawals." In an attempt to address the concerns of the Tribes and the state and federal agencies, the applicant contracted Dr. Greg Garman of Aquatic Resources, LLC, to conduct a study of the potential impacts of the proposed withdrawal on anadromous fish. As part of the study, Dr. Garman attended a meeting with the Mattaponi Tribe, the District and EPA on 28 April 1997 to discuss the Tribe's concerns and to more clearly understand the issue from their unique point of view. In a report entitled, "Analysis of Potential Effects of Water Withdrawals for the King William Reservoir on American Shad (*Alosa sapidissima*) and Related Anadromous Clupeid Fishes in the Mattaponi River, Virginia, A Review of the Current and Relevant Scientific Literature," dated 7 August 1997, Dr. Garman provided a qualitative evaluation of the potential for adverse impacts as the direct result of the water withdrawal. Dr. Garman found that fish assemblages of the tidal freshwater portion of the Mattaponi River have been inadequately surveyed and relevant and useful data on anadromous fish in the Mattaponi River is extremely limited. Dr. Garman concluded that "With a few exceptions, there existed only a very limited amount of biological or ecological information that can be used to make direct judgments concerning the likely impacts of the King William Reservoir on the ecologically and economically important anadromous clupeid populations of the Mattaponi River." Dr. Garman further stated that without the availability of such basic descriptive information as temporal and spatial distribution, spawning and early life history stages, it was very difficult to accurately assess the potential for ecological impacts from the proposed project.

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One potential impact that could result from the intake operation is unacceptable fish mortality from entrainment and impingement of fish eggs and larvae. The applicant has designed the intake in accordance with the recommendations of the National Marine Fisheries Service and Virginia Department of Game and Inland Fisheries to reduce impacts to anadromous fish. The intake design incorporates wedge-wire slot mesh screens with one-millimeter screen openings and entrance velocities not to exceed 0.25 feet per second. Also, the intakes would be placed midway between the river bottom and the average water surface to avoid those eggs that float on the surface or roll on the bottom. In addition, the intake structures would be aligned parallel to the river flow. These measures should reduce impacts to anadromous fish eggs and larvae. However, even with these measures, some eggs and larvae that are impinged on the intake screens would be damaged or destroyed. As the maximum swimming speed of early American shad larvae is 0.16 feet per second and the maximum intake velocity would be 0.25 feet per second, these early larvae would be unable to escape the intake flow. American Shad and Hickory Shad eggs exceed 1.0 mm in diameter (up to 3.5 mm), and after a 24-hour water-hardening period, are slightly heavier than water. They would likely settle to the bottom, but they are light enough to be re-suspended by currents. On the other hand, the eggs of Alewife and Blueback Herring would be susceptible to greater impact from entrainment because they are considerably smaller (0.87 to 1.21 mm) and are distributed throughout the water column. Some eggs and juveniles of other fish species and food particles that are smaller than the one-millimeter screen openings would be pulled into the intake. This could affect food supplies that are necessary for the survival and growth of juvenile shad and other anadromous fish populations in the Mattaponi River. While it is unknown whether fish would group at the intake and become easy targets for predator species, such behavior has been observed by researchers in other areas.

Because of the lack of recent and quantitative data on American shad distributions, it was not possible for Dr. Garman to predict the effects of changes in river hydrodynamics on juveniles or their critical habitat. However, Dr. Garman felt that if the conclusions of the applicant's salinity study were correct, the withdrawal of water would be unlikely to have a significant, direct impact on early life history stages of anadromous fishes because river discharges are typically higher during the spring when spawning occurs. Nevertheless, he expressed concern that adequate stream flows and natural hydroperiods be maintained during the summer months to protect the riverine and riparian habitat for juvenile fish and suggested the maintenance of a more conservative minimum instream flow (MIF) than the 40/20 Tennant method proposed by the applicant for this critical period. The Virginia Department of Game and Inland Fisheries recommended that the RRWSG adopt the Modified 80% Exceedence flow schedule as well as a time-of-year restriction for all construction activities in the Mattaponi River from 15 February through 30 June to protect spawning individuals.

Although American shad and other related species would be exposed to slightly increased salinity regimes in the freshwater reaches of the Mattaponi River as a result of the freshwater withdrawal, Dr. Garman cited recent laboratory studies which suggest that these fish are strongly salinity tolerant and would not be significantly affected by such changes. During upstream migration, the adult shad would have recently traveled from highly saline waters to freshwater; therefore, Dr. Garman did not concur with the Tribe's claim that adult American shad would be "extremely sensitive" to changes in salinity. However, as American shad spawn only in freshwater (less than 0.5 parts per thousand salinity), any salinity changes associated with the withdrawals could affect where and when these fish spawn in the River. In a letter dated 14 January 2000, the Mattaponi Tribe submitted a review of Dr. Garman's report that was prepared by Dr. Edward F. Cheslak, an aquatic ecologist. Dr. Cheslak referenced a 1997 study by Zydlewski and McCormack indicating that while adult and out-migrating juvenile American shad are known for their

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salinity tolerance, full development of salinity tolerance does not occur until the onset of the larval-juvenile metamorphosis (26 to 45 days from the egg stage). Therefore, there would appear to be the potential for a reduction in the survival, development and growth of early life stages of shad as a result of salinity changes in the Mattaponi River. The viability of the shad fry that are released from the Mattaponi Tribe's hatchery could also be affected as they are released before this metamorphosis occurs. The fry are released in two stages. Those that are not tagged are released 7 to 9 days after hatching, while those held for tagging are released 16 days after hatching. The applicant has cited earlier laboratory studies indicating that shad and blueback herring eggs and larvae can tolerate a wide range of salinity levels.

Based on the limited information available to him and on the assumption that the applicant's predicted salinity and hydroperiod changes are accurate, Dr. Garman concluded that "there does not appear to be a substantial or scientific basis to claims of significant and detrimental impacts to migratory fish populations in the Mattaponi River as the direct result of the construction and operation of the King William Reservoir." However, Dr. Garman particularly noted that his review did not consider the potential for indirect ecological effects as the result of physicochemical changes on fish assemblages of the tidal Mattaponi River. Dr. Garman noted that his conclusions are based on a review of the currently available literature and did not include field data collection.

Dr. Cheslak disagreed with much of Dr. Garman's findings and believes that the report is incomplete because it is limited to direct results of the water withdrawal only and does not address indirect effects. Dr. Cheslak stated that such an omission is biologically significant as many of the major impact of water withdrawals on anadromous fish are indirect in nature. He further criticized the report for making any conclusions regarding detrimental impacts to anadromous fish with so little available data. Dr. Garman concurred that there was so little useful data available on the fishes and the system ecology of the Mattaponi River that he was at a disadvantage in his limited study to be able to make specific determinations on potential impacts. However, he stated that his effort complied with the Scope of Work for the study provided by the City of Newport News (personal communication, October 2000).

Comments Received on the RROD Regarding Anadromous Fish in the Mattaponi River: Comments were received from the RRWSG in their report dated 4 May 2001; from Dr. Paul Jacobson of Langhei Ecology, LLC in a letter dated 2 May 2001; and from the Institute for Public Representation, representing the Mattaponi Tribe in a letter dated 4 May 2001. The City of Newport News provided extensive comments regarding anadromous fish in the Mattaponi River. I will address the general issues raised. I will not address each comment in detail, however, as this issue was not by itself a major factor in my decision. A detailed response to each point in the City's comments is contained in a memorandum for the record which is a part of the administrative record.

The City of Newport News claims that the Norfolk District has not presented reliable, scientific evidence showing that the project could seriously impact American shad, whereas they have sponsored numerous studies showing that there would be no serious impacts to the shad. Contrary to the RRWSG's claims, they have submitted one independent study of anadromous fish issues in the Mattaponi River performed by Dr. Greg Garman. The report prepared by Dr. Garman is a review of the current and relevant scientific literature. Dr. Garman performed no independent sampling or field research, considered only the direct effects of the project on anadromous fish, and, perhaps most importantly, assumed that the models employed for analysis, including the salinity intrusion model applied by VIMS, are accurate and appropriately validated. Despite these stated limitations to his study, Dr. Garman reported that "the most significant finding of this review was the almost total lack of recent and quantitative data relating to the

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structure and function of the Mattaponi River ecosystem, particularly the fisheries ecology of tidal, freshwater reaches.” As stated on page 111 of the RROD, Dr. Garman reported that “there existed only a very limited amount of biological or ecological information that can be used to make direct judgments concerning the likely impacts of KWR on the ecologically and economically important anadromous clupeid populations of the Mattaponi River...and without such basic descriptive information, it is very difficult to assess accurately the potential ecological impacts of a project such as the one proposed.” Dr. Garman also indicated in his report that maintenance of adequate instream flows and natural hydroperiods during summer months may be of concern, and that any attempt to predict the effects of changes in river hydrodynamics on American shad juveniles, or on their critical habitat would be speculative. Dr. Garman further stated, with regard to the salinity modeling, that the model does “...suggest that a small increase in the frequency of intrusion by oligohaline (0.5 – 5.0 ppt) waters into fresh waters may occur during the operation of KWR” ...and... “...the one-dimensional salinity intrusion model employed by Hershner *et al.* may not be comparable to more recent, three-dimensional models, which may be more accurate for large and complex river ecosystems like the Mattaponi.” He concluded that “it is likely that American shad and related species in this reach of the Mattaponi mainstem would be exposed to slightly altered salinity regimes as the result of freshwater withdrawals for KWR IV.” Therefore, as stated on pages 111 and 195 of the RROD, I determined that the study finds that, “for the specific situations considered by this study, the potential for direct impacts from KWR was hypothesized to be minor,” are not conclusive evidence that there would be no serious impacts to the shad.

The City of Newport News claims that the Norfolk District and the federal advisory agencies have failed to identify any proven scientific tools that would allow the RRWSG to conduct an analysis that would achieve the Norfolk District’s desire to determine the “indirect ecological effects as a result of physiochemical changes on fish assemblages.” Dr. Garman reported that the lack of basic biological and ecological information on the fish populations in the Mattaponi River make it difficult to accurately assess the potential ecological impacts of the project. In addition, Dr. Garman indicated that, while the physiological mechanisms of salinity tolerance in other species has been well studied, it has not been thoroughly studied in members of the genus *Alosa*, which includes American shad. In particular, studies showing how egg and larval survival, growth and development vary across a salinity gradient are lacking.

The City of Newport News contends that the Norfolk District has set an unreasonable standard in stating that the intake structure would reduce but not eliminate impacts to anadromous fish eggs and larvae. The RRWSG stresses that regulations do not require that all impacts be eliminated, only that their significance be assessed. The City emphasizes that the proposed intake design represents the state of the art technology to limit entrainment and impingement impacts. Contrary to the City’s assertion, the Norfolk District has not indicated that the impacts to the anadromous fish populations as a result of entrainment and impingement alone would be significant. I confirmed in the RROD on page 112 that the intake design and position should minimize impacts to anadromous fish and larvae.

The City of Newport News questioned the data showing that the maximum swimming speed of early American shad larvae is 0.16 feet per second. Dr. Edward F. Cheslak cited this number in his letter dated January 12, 2000 and referenced Dr. Garman’s report, in which Dr. Garman referenced a 1973 paper by Darton C. Marcy, Jr. on fish survival at a nuclear power plant in Connecticut. The City also questioned why the Marcy paper would be cited at all, as it refers to a project with different parameters from the current proposal. The City of Newport News stated that any conclusions about fish impacts at the nuclear power plant’s intake structure cited in the Marcy paper cannot be extrapolated to the RRWSG’s project. The RRWSG is correct that the statement that the maximum swimming speed of early American shad

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larvae is 0.16 feet per second should not be attributed to the 1973 Marcy paper. However, Dr. Garman stated in his report that “early larvae (<20 mm TL) were unable to swim against sustained intake velocities as low as 0.05 m/s.” It should be noted that 0.05 meters per second is equivalent to 0.164 feet per second. Accordingly, it would be reasonable to assume that larval shad in the immediate vicinity of the intake structure would be unable to swim against the 0.25 foot per second velocity of the proposed intake structure, and would be impinged. The 1973 Marcy paper was reviewed, and while it does contain some useful general information about fish entrainment and impingement, I did not use the specific results of that study in making my decisions regarding this project.

The City of Newport News believes that Dr. Cheslak’s calculation of a project-induced current velocity in the vicinity of the intake of 2.95 fps is erroneous, and therefore his conclusions about potential impacts from withdrawals are invalid. The City is correct that Dr. Cheslak miscalculated the maximum intake velocity, by ignoring the size of the intake screen. Contrary to the City’s statement, however, this information is not referenced in the RROD, nor did I consider it in my conclusions.

The City of Newport News claims that the Norfolk District ignored that project-induced flow velocities would substantially decrease with growing distance from the intake screens and, in turn, substantially reduce the potential for entrainment of slow swimming shad larvae. The RROD acknowledges that the intake is designed in accordance with recommendations of National Marine Fisheries Service and the Virginia Department of Game and Inland Fisheries. The RROD does not predict how many fish would be affected, it merely states that some impingement and entrainment at the intake would be expected.

The City of Newport News contends that both the Norfolk District and Dr. Cheslak anticipate impacts to shad due to salinity changes, but cite a study that subjected shad larvae to seawater salinities (35 ppt). The RRWSG cites another paper, by Limburg and Ross (1995), that suggests that American shad are tolerant of salinities up to 20 ppt. I concur that various life stages of American shad are tolerant of higher salinities, however, it is clear that adult American shad spawn exclusively in fresh water and that the project would result in an upstream migration of oligohaline (0.5 to 5 ppt) water. While the potential for impacts to American shad and other anadromous fish in the Mattaponi River alone may not be significant, I am required to consider them cumulatively with other adverse impacts resulting from the project. Dr. Paul Jacobson of Langhei Ecology, LLC endorsed many of the conclusions in the RROD regarding the project’s potential impacts to anadromous fish in the Mattaponi River and largely concurred with Dr. Garman’s report. He cited a 1981 study by Boreman, *et al.* indicating that it would be possible to make quantitative projections of entrainment of American shad and other fish in the river if the temporal-spatial distribution of eggs and larvae and information on the design and operational characteristics of the intake were provided. He indicated that although the proposed 1 mm wedge-wire screens would effectively exclude American Shad eggs and all postlarvae larger than 13 mm total length, prolarvae and early postlarvae (less than 13 mm total length) would not be excluded with 100% efficiency. Consequently, he finds that the distribution of these life stages in the river relative to the intake location is critically important. He agrees with Dr. Garman that distributional information is deficient, however, he states that existing published information (i.e., Massmann 1952), does indicate that the proposed intake is within the very short reach in which spawning occurs. He feels that such concentrations of larvae near the intake would be a significant factor in the potential for entrainment impacts. He believes that Dr. Garman has overstated the potential for impingement mortality of eggs since he cites a study (Marcy, 1973) involving 10 mm mesh screens. He noted that salinity tolerance data are derived from laboratory experiments and, therefore, evaluate the effects of salinity in isolation from countless other functionally interrelated ecological variables affecting shad in the wild. Consequently, salinity tolerance may not fully represent

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the ecological significance of salinity alterations most notably to early life history stages of *Alosa* spp. He states “These factors may respond directly or indirectly to alterations of the salinity regime of an estuary, in which case saltwater intrusion represents a loss of tidal freshwater habitat for *Alosa* spp. despite any physiological tolerance of the salinity.”

Dr. Jacobson’s comments are consistent with my findings. Dr. Jacobson’s conclusions are also consistent with the 1991 Funderburk *et al.* report cited by the RRWSG, which lists a range of habitat requirements for shad at various life stages and indicates that shad’s tolerance to salinity depends on other environmental factors, including temperature, turbidity, pH, suspended solids and dissolved oxygen.

In a letter dated 4 May 2001, the Institute for Public Representation (IPR), representing the Mattaponi Tribe, commented that several important comments made by Dr. Cheslak regarding impacts to anadromous fish were not reflected in the RROD. IPR stated that although the RROD accurately summarizes Dr. Cheslak’s comments on the potential adverse effects of the King William Reservoir on anadromous fishes in the Mattaponi River, the RROD should provide more detail of Dr. Cheslak’s criticisms of Dr. Greg Garman’s 1997 report. In addition to criticizing Dr. Garman for making conclusions based on incomplete data, Dr. Cheslak also criticized Dr. Garman for improperly analyzing available data, for failing to evaluate the accuracy and precision of his experimental models, using inappropriate hydrological statistics, failing to use a process oriented analysis which places the proposed withdrawals in the proper context, failing to identify the ecologically relevant intensities of the impact, relying on irrelevant studies and relying on other studies with poor experimental designs and low sample size. IPR also suggested that the District use Dr. Cheslak’s comments to evaluate the analysis and conclusions of Dr. Charles Gowan’s report entitled “A Sampling Program to Document Levels of Impingement and Entrainment at the Proposed King William Reservoir Intake” and the District’s report entitled “Monitoring Study Development for Impacts of the Proposed King William Reservoir and Mattaponi River Intake.” While Dr. Cheslak has identified some important limitations to Dr. Garman’s study, my conclusions are not based exclusively on either Dr. Garman’s or Dr. Cheslak’s comments, but are based on a comprehensive and objective review of a variety of scientific literature and research. Likewise, the monitoring protocol presented in the Gowan and Corps reports are based on a variety of scientific studies, including, but not limited to, Dr. Garman’s report. As such, I believe it is unnecessary to reevaluate those reports.

(2) Cohoke Creek: Limited fish surveys conducted in Cohoke Creek both upstream and downstream of the Cohoke Millpond dam identified 38 species within the watershed. The Virginia Department of Game and Inland Fisheries indicated that the species lists for the Cohoke Creek and Black Creek sites are “inadequate and poorly represent the true diversity of the system.” The U. S. Fish and Wildlife Service stated that fish abundance and diversity information for Cohoke Creek is lacking and that information from the limited sampling is not adequate to assess the impacts of the proposed reservoir to the system. Both the Service and the VDGIF believe that the transformation of Cohoke Creek from a lotic and shallow lentic habitat to deepwater lentic habitat would have a significant impact on the composition of the fish assemblage. Construction of the dam and inundation of the pool area would impact fish species within the reservoir pool area through increased levels of suspended sediment and the elimination of benthic food organisms and vegetation for spawning, nursery and shelter.

The City of Newport News claims that an enormous freshwater fishery would be created by the reservoir which would more than compensate for the project’s impacts to resident fisheries. Some of the fish species found in Cohoke Creek have been documented in other reservoirs where conditions were

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favorable for their existence. Although some fish species may be able to persist in the reservoir, others that rely on the flowing creek system would be eliminated through its conversion to a deep-water lacustrine system. Because of the limited species data, the extent to which extirpation would occur is unknown. The U.S. Fish and Wildlife Service does not consider the replacement of native fish species in a lotic habitat by lentic game species as a resources enhancement as claimed by the RRWSG. In his report on the effects of the water withdrawal, Dr. Greg Garman expressed concern that non-indigenous fish stocked in the King William Reservoir would likely escape into the Pamunkey River and eventually become established in the Mattaponi River. These non-indigenous fish could negatively impact native fish in the rivers by predation and competition. The U. S. Fish and Wildlife Service expressed similar concerns and also recommended that resident fish populations that survive in the reservoir be protected from undue entrainment and egg loss at the outflow pipe.

Construction of the King William Reservoir would permanently block the potential passage of spawning anadromous and catadromous fish into the upper 21 miles of Cohoke Creek effectively precluding the future restoration of potential anadromous fish spawning habitat in that section of the Creek. The 1987 Chesapeake Bay Agreement has placed a special emphasis on the removal of blockages to anadromous fish and on restoring historic spawning grounds. According to the National Marine Fisheries Service, the restoration of depleted anadromous fish stocks within the watersheds of the York River basin has been identified as a priority action of the Chesapeake Bay Agreement. Therefore, any manipulation of flow in stream and rivers supporting these species would not be in the best interest of current restoration efforts.

Anadromous fish passage in Cohoke Creek is presently blocked by the existing 100-year old Cohoke Millpond dam. Surveys have identified alosid eggs, larvae and juveniles in the lower tidal portion of the Creek between the millpond dam and the Pamunkey River and there is historical evidence that before the millpond was constructed, Cohoke Creek provided spawning and nursery habitat for blueback herring and alewife. In the spring of 1992, the Virginia Department of Game and Inland Fisheries recorded blueback herring at the Cohoke Millpond spillway and indicated that herring and alewife would spawn in the upper reaches of Cohoke Creek if fish passage was provided. VDGIF has identified herring species as a primary focus of concern due to the currently depressed condition of regional herring populations. Both the U.S. Fish and Wildlife Service and the National Marine Fisheries Service commented that the area upstream of Cohoke Millpond dam represents potential spawning habitat for anadromous and semi-anadromous species. Although Cohoke Millpond is not currently listed as one the state's priority areas for restoration, the U.S. Fish and Wildlife Service feels that fish passage could be readily restored by the installation of a passage device in the 6-foot high Cohoke Millpond dam. The Service disagrees with the RRWSG's claim that the proposed 78-foot high King William Reservoir dam would result in minimal impact to the restoration of anadromous fish habitat.

At the applicant's request, Dr. Greg Garman conducted a visual evaluation of the potential for restoration of spawning activities above the millpond dam and presented his findings in a report entitled "Qualitative Assessment of Instream Habitat Quality of Cohoke Creek (King William County, Virginia) for Anadromous Clupeid Fishes (*Alosa* spp.)," dated 18 September 1997. Dr. Garman clarified that with this type of qualitative analysis, it is not possible to determine the extent to which potential habitat in Cohoke Creek would be utilized by anadromous fish, but offered his opinion based on his observation of existing conditions. Dr. Garman observed outstanding reproductive habitat for *Alosa* spp. in the short tidal reach of Cohoke Creek below the Cohoke Millpond. He felt that if fish passage was provided at the Millpond dam, it is likely that blueback herring and alewife would attempt to spawn in the 2.1 miles between the millpond and the proposed KWR-IV reservoir site. However, Dr. Garman believed that under present

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conditions, spawning would be unlikely above the proposed reservoir dam site due to the extensive influence of beaver activity and the very limited stream gradient. Since beaver dams and the resultant ponds are not permanent features, this conclusion pertains only to conditions as they existed at the time of Dr. Garman's visual survey. The federal and state agencies who are experts in this matter have determined that the area above the Cohoke Millpond dam represents potential habitat for anadromous fish and I have no reason to disagree with their finding.

As mitigation for the reduction in anadromous fish habitat in Cohoke Creek, the Service recommended providing fish passage at a suitable location such as Ashland Mill Dam on the South Anna River as a condition of the Corps permit, if granted. EPA indicated their support for the provision of off-site fish passage as compensation for the loss of habitat in Cohoke Creek. Even though the City of Newport News does not concur that potential anadromous fish habitat would be lost, they agreed to work with the VDGIF to identify dams on one or more priority streams in the York River basin for fish passage restoration. The Ashland Mill Dam in Hanover County (10 miles), Herring Creek Millpond (9.5 miles) and Gravett's Millpond (4 miles) in King William County which are known to have historically provided anadromous fish habitat are being evaluated, but the RRWSG has not identified the number of miles of stream on which they plan to restore anadromous fish passage.

Intakes for the downstream release of water from the proposed KWR-IV dam into Cohoke Creek would be located at elevations 80, 65 and 45 feet at mean sea level. Each pipe would be sized for a downstream release of up to 4 mgd. The RRWSG's modified proposal is to release an average of 2.5 mgd during normal higher reservoir pool condition and a 1.5 mgd average annual release would be used when the King William Reservoir storage declines to less than 80 percent (which equates to a reservoir pool elevation of approximately 92 feet at mean sea level. These releases would equal about one third of the existing estimated 6.2 mgd average flow at the dam site.

The operation of the reservoir would reduce the net average freshwater flows to the Pamunkey River by approximately two thirds and would affect fish habitat in the downstream portions of Cohoke Creek as well as in Cohoke Millpond. The applicant claims that Cohoke Creek is a minor tributary of the Pamunkey River so the impoundment would not adversely affect it and its fish populations. However, the U. S. Fish and Wildlife service expressed serious concern over the quality and quantity of reservoir water released into the downstream Cohoke Millpond and Pamunkey River. Also, in their 12 March 1996 comments on the Supplement to the DEIS, the National Marine Fisheries Service expressed concern that only one third of the average streamflow would not be sufficient to maintain acceptable fish habitat downstream of the dam.

According to the VDGIF, research has shown that a reduction in stream flow of this magnitude would adversely impact aquatic biota. As they believed the applicant's proposed downstream release would not adequately protect the integrity of fish populations and wetlands in Cohoke Creek, and may significantly impact water levels in Cohoke Millpond, VDGIF recommended that the release be increased to maintain median monthly flows. They also recommended release of 75% epilimnetic water between June and October to prevent temperature shock and oxygen depletion that could stress and kill fish and recommended that temperature and dissolved oxygen be monitored below the dam. A condition of DEQ's water quality permit requires monitoring for temperature, dissolved oxygen and pH below the release point from the King William Reservoir.

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The Pamunkey Tribe operates a shad hatchery on the Pamunkey River about three miles upstream of Cohoke Creek. Reduced flows from Cohoke Creek should not have a significant effect on flows in the Pamunkey or York Rivers, but the combined reduction in freshwater input to the Mattaponi and Pamunkey Rivers due to the project could be substantial. I agree with the U.S. Fish and Wildlife Service's concern that "The potential of saltwater intrusion to decrease the tidal freshwater zone of spawning habitat on the Pamunkey and Mattaponi Rivers could seriously impact populations of American shad and striped bass." as expressed in their 28 March 1996 comments on Supplement to Draft EIS.

Comments Received on the RROD Regarding Anadromous Fish in Cohoke Creek: In a letter dated 2 May 2001, Dr. Paul Jacobson of Langhei Ecology, LLC concurred with my description of the spawning habitat for *Alosa* spp. in Cohoke Creek and stated his belief that significant restoration potential exists above the current blockage at Cohoke Millpond Dam and that there would be substantial harm to the existing spawning habitat in Cohoke Creek from reduced freshwater discharge. He strongly concurs that the complex interactions of complete ecosystems must be taken into account in the restoration and management of anadromous fishes. He states "There is a growing awareness among fisheries scientists that the landscape in which a waterbody is embedded plays a critically important role in the condition and sustainability of an aquatic ecosystem and its fish community."

k. Monitoring Plan: The Norfolk District determined that monitoring would be necessary in order to identify potential negative impacts of the proposed impoundment, intake structure and 75 mgd withdrawal and to develop plans to ameliorate any detrimental impacts if a permit were issued. A panel of experts was convened in a cooperative effort to develop monitoring protocols that would effectively analyze pre and post-withdrawal environmental conditions in the Mattaponi River and allow modification of in-stream conditions should tests indicate that there had been an impact. Likewise, monitoring protocols were developed to analyze pre and post-dam construction conditions in Cohoke Creek and allow modification of downstream releases should tests indicate that adverse impacts had occurred. This effort identified the factors that need to be monitored, but does not constitute a plan to rectify any detrimental impacts to the environment that might be identified as a result of the monitoring. The goals were to determine the effects of the project on the River, and to gather information that would be useful in solving problems related to the health and welfare of the biota. The information would also provide baseline data so that permit changes may be undertaken in a timely manner should problems or concerns be raised during the monitoring period. The Corps believes that the conditions in the specific monitoring plans would provide valid information and allow modification of both in-stream and downstream conditions should tests indicate that there has been an impact.

An interagency task force was established to develop consistent and acceptable monitoring conditions for the Mattaponi River and Cohoke Creek. The following individuals participated in the task force: Dr. Albert Kuo and Dr. Carl Hershner from the Virginia Institute of Marine Science, Don Schwab and Tom Wilcox from the Virginia Department of Game and Inland Fisheries, Dr. Patrick Megonigal and Dr. Arlene Darke, from George Mason University, Garrie Rouse of Rouse Environmental Services, Inc., Dr. Greg Garman of Aquatic Resource, LLC, Dr. Charles Gowan of Randolph Macon College, Sandra Erdle, Lesa Berlinghoff and Steven Carter Lovejoy from the Virginia Department of Conservation and Recreation/Division of Natural Heritage, Bob Unnasch and Judy Dunscomb of The Nature Conservancy, Joe Hassell from the Virginia Department of Environmental Quality, Janet Norman from the U.S. Fish and Wildlife Service, Regina Poeske from the U.S. Environmental Protection Agency, Pamela Painter and Ken Kimidy of the U.S. Army Corps of Engineers, David Morris from Newport News Waterworks, and Bruce Aitkenhead and Rebecca Dorsey of Malcolm Pirnie, Inc.

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The group developed a list of physical, chemical and biological issues which needed to be addressed in a monitoring plan for the project. The issues were separated into vegetation, water quality/water quantity, and fisheries and wildlife impacts. Drs. Hershner, Megonigal, Darke, Garman, and Gowen submitted draft monitoring reports which outlined specific concerns raised by the members of the river monitoring task force. Annual reporting required as a condition of a Corps permit would be drawn from this data and all task force members would be able to access the raw data for comparison. Review of the data would be undertaken yearly and any anomalies in the data would result in the task force meeting to discuss the issues and attempt to modify conditions to correct any apparent problems with either downstream releases or MIF conditions. The group agreed that monitoring should be undertaken even during the period where the reservoir was being filled. The group also discussed certain testing requirements which could be undertaken to simulate a worst case analysis prior to the final river conditions being set by the permitting agencies.

(1) Wetland Vegetation: A study was proposed that would evaluate processes affecting freshwater wetlands from the perspectives of the watershed (macroscale), floodplain (mesoscale), and individual marshes (microscale). The use of field studies, remote sensing and Geographic Information Systems (GIS) is necessary in order to focus on the changes in freshwater flows resulting from water withdrawal. The review of changes in salinity, specifically soil pore water salinity, sediment loads, and the effects on marsh geomorphology and substrate availability for plants would be undertaken in order to assess the changes in ecosystem functions. Through the monitoring of soil pore water salinity, soil deposition/erosion rates, plant community composition, and peak season cover and biomass, the study would provide early indications of salinity stress. Details of the monitoring study can be found in the Monitoring Plan for the Mattaponi River: Wetland Vegetation submitted by Dr. Arlene Darke and Dr. Patrick Megonigal.

Potential impacts from erosion and accretion of the shoreline, long-term salinity changes and the introduction of invasive species on populations of sensitive joint-vetch in the vicinity of the proposed Mattaponi River intake were of concern to the monitoring team members. However, as formal consultation under Section 7 of the Endangered Species Act was being undertaken simultaneously with the development of monitoring conditions, the development of monitoring protocols for the sensitive joint-vetch by the monitoring team would have been premature. Any conservation recommendations made by the U.S. Fish and Wildlife Service to minimize adverse effects to the sensitive joint-vetch colonies would be considered for inclusion as conditions of the Corps permit.

(2) Impingement and Entrainment: Dr. Gowen provided an overview of entrainment and impingement concerns for water supply intakes. The goal of this research would be protection of fish within the waterway through preventing impingement (fish or eggs being stuck to the screen), prevent entrainment (fish or eggs being sucked through the screen), and to get the fish away from the facility. Design considerations must include the screen size, location, and orientation, the velocity characteristics of the intake, the approach velocity to the screen (must be slower than the fishes sustained swimming speed), and the sweeping velocity which allows the eggs or fish to move away from the facility. All pipes and screens must be smooth, with no ragged edges, in order to decrease or eliminate the descaling or injury of the passing fish. The plan for cleaning or blowing out the system must include protection of the eggs and fish in the vicinity during the cleaning activity. Monitoring is an important criterion in assessing the success of the exclusion at the intake site. In order to detect potential concerns, the sweeping and approach velocities need to be measured 3-6 inches in front of the screen and potential hot spots (high approach velocities or low sweeping velocities) must be corrected through baffles or angle shifts in the

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structure. There are several tests that can assess successful avoidance including releasing marked fish upstream of the facility and recapturing them below the intake to evaluate passing efficiency and mortality rates. Predators are also a problem at intake locations due to the creation of eddies which may capture smaller fish that are not capable of sustained bursts of speed to escape the area. Tidal flows may help sweep the fish and eggs across the screens but may also create unacceptable conditions during slack tide. Consideration should be given to monitoring at the worst case scenario for fish and eggs in order to predict the periods of greatest impact.

Dr. Gowen developed a draft monitoring plan to document the magnitude of potential impacts resulting from intake operation on the Mattaponi River. The study would also provide early notification should there be unacceptably high impingement or entrainment losses in order to allow rapid modification to project design or operation to reduce the impacts. As part of the project development, all screens must be examined prior to installation to insure that the 1-mm screen size is universal across the screen. In addition, once the screens are installed, they must be inspected underwater to insure they are not damaged and that all joints and seals are intact. The approach velocities (perpendicular to the screen surface) and the sweeping velocity (parallel to the screen surface) must be measured at several (12) points along each cylinder to determine if the intakes are operating properly and appropriate baffles are installed should faster conditions be found. Sampling protocols are specifically outlined in the plan submitted by Dr. Charles Gowen.

(3) Fisheries: The fisheries monitoring plan proposes to use quantitative data to analyze key ecological components of the fishery assemblage, evaluate the temporal trends and spatial patterns of fish abundance, community structure, and habitat quality associated with the intake structure. Utilizing a paired synoptic design, the study would include the adjacent and ecologically similar Pamunkey River to prevent observed changes in the Mattaponi River after intake operation to be attributed incorrectly or prematurely to the withdrawal. If statistically significant changes not attributable to natural variability are found, further study will be undertaken to determine the causal effect of the change and proposed changes to the withdrawal patterns would be developed. Direct effects associated with anadromous species and temporal and spatial patterns of the entire fish assemblage would be analyzed in the study as well as indirect effects such as growth rates of the target species. The specific information related to the fisheries study can be found in the Fisheries Monitoring Plan for the Mattaponi River submitted by Dr. Greg Garman.

(4) Water Quality: The Virginia Institute of Marine Science submitted a proposal to monitor water quality parameters, including: total particulate carbon, dissolved organic carbon, total particulate nitrogen, total dissolved nitrogen, ammonium nitrogen, nitrite-nitrate nitrogen, total particulate phosphorus, particulate inorganic phosphorus, total dissolved phosphorus, dissolved phosphate, particulate inorganic silica, dissolved silica, Chlorophyll 'a'/phaeophytin, chemical oxygen demand, and dissolved oxygen. The monitoring plan proposes the collection of data from the mouth of the York River, the confluence of the Pamunkey and Mattaponi Rivers, and from the freshwater/salt water transition within both of these rivers. Sampling protocols are outlined in the proposal submitted by VIMS.

(5) Cohoke Creek Monitoring: Since riparian wetlands are defined by hydroperiods that determine the plant community composition, dam operations will influence the hydrologic regime of the downstream wetlands by reducing the variability of the stream discharges. This change could have a major influence on ecosystem functions. Megonigal and Darke developed a paired monitoring design utilizing Totopotomoy Creek as a control in order to infer that the trends observed in Cohoke Creek only

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represent the effects of the reservoir while simultaneous trends observed in both creeks represent more widespread influences. The use of Totopotomy Creek was proposed because DEQ utilized Totopotomy Creek as a surrogate for Cohoke Creek to estimate stream flow rates. Monitoring of Cohoke Creek must be undertaken prior to any reservoir construction and calibrated with stream flow on Totopotomy Creek. Flow rates, channel contour, peak season percent cover and vegetation composition and water depths within the wetland system would be monitored to determine relative changes within the downstream watershed.

(6) Final Coordination Requirements: These monitoring plans were presented and discussed with representatives of the Pamunkey, Upper Mattaponi and Mattaponi Indian Tribes during a 24 September 1998 meeting with Norfolk District representatives. District staff discussed the process by which the various monitoring plans were developed and how the concerns of the Tribes were taken into consideration in their development.

In their Virginia Water Protection permit, the Virginia Department of Environmental Quality required the development of a detailed eco-monitoring plan within 24 months of issuance of the permit on 22 December 1997 to identify spawning and nursery grounds of the Mattaponi River used by anadromous fish. To date, the District has not seen such a plan. Also, as part of their proposed mitigation for impacts to Traditional Cultural Properties, the City of Newport News offered to provide financial assistance to the Mattaponi and Pamunkey Tribes to upgrade their existing fish hatcheries.

In the event that a permit were issued for the project, the District, in consultation with state and federal advisory agencies, would have to resolve any outstanding concerns regarding the monitoring studies (e.g., exact sampling locations). Additionally, the applicant would have to provide sufficient assurances that financial resources are available to perform the needed monitoring over the long-term, and to fund any needed corrective actions. In the event that monitoring reveals that changes in the operation of the intake and reservoir are needed to prevent degradation to the aquatic environment, the District Commander may modify the conditions of the permit in accordance with 33 CFR 325.7 to require such actions as greater downstream releases or the withdrawal of less water from the Mattaponi River. (For a detailed discussion of the development of monitoring protocols, see the District's report entitled "Monitoring Study Development for Impacts of the Proposed King William Reservoir and Mattaponi River Intake.")

1. Aesthetics:

(1) Mattaponi River: In their document entitled "Management Plan and Chesapeake Bay Virginia National Estuarine Research Reserve System," VIMS placed the Mattaponi River among the most pristine rivers on the east coast. The Virginia Department of Conservation and Recreation, Natural Heritage Division has indicated that the Mattaponi River supports a system of state significant and exemplary freshwater tidal marshes and swamps that provide high diversity habitat for both common and rare species. The Nature Conservancy has also identified the Mattaponi River as a national wetland priority under its National Wetland Conservation Program. The river possesses natural scenic beauty in its sloping forested terrain and relatively undeveloped shoreline. No major urban or industrial development occurs on the river and it currently exhibits excellent water quality and experiences only minor consumptive uses.

According to the 1996 Virginia Outdoors Plan, a segment of the Mattaponi River from Mundys Bridge on Route 628 to the Walkerton Bridge on Route 629 has been evaluated and qualifies as a Virginia Scenic

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River. Also, the state has determined that segments of the Mattaponi River in King William County and King and Queen County from Route 628 to Mundys Bridge and from Aylett to West Point should be evaluated to determine their suitability as a Virginia Scenic River.

The Mattaponi River was also designated in 1998 as one of the 20 most endangered rivers in the U.S. by American Rivers, a national river conservation group, because of the threat to the river's ecological integrity from the proposed RRWSG water supply plan. The middle to lower Mattaponi River has also been listed as a probable candidate for meeting the DEQ criteria for nomination to the Exceptional Waters program, which affords special protection to the most unique and sensitive waters in Virginia. Along with the Pamunkey River, portions of the Chickahominy River, and some creeks of the Rappahannock River, the Mattaponi River is described by The Nature Conservancy as "the heart of the most pristine freshwater complex on the Atlantic Coast." As there are no existing impediments, the Mattaponi River currently provides spawning habitat for anadromous fish species along its entire length.

The Mattaponi Tribe has a unique cultural perspective of the Mattaponi River that goes beyond aesthetics. The Mattaponi people believe that the Mattaponi River is more than a simple body of water. To them, it is a spiritual place that unites tribal members through baptism and other religious ceremonies. The Mattaponi Tribe claims that alterations to the natural state of the river would compromise the sanctity of these religious ceremonies. They believe that the river is a gift of life from the Great Spirit that provides and completes the circle of life. The Tribe believes that to defile the Mattaponi River would be to dishonor the Tribe's ancestors and Mother Earth.

The intake pump station structures and the surrounding cleared areas would disrupt the pristine nature of the shoreline when viewed from the river. Construction activities would temporarily increase noise levels, and the pump station operation would result in a long-term increase in ambient noise levels. The applicant proposes to implement architectural and landscaping treatments that would minimize pumping noise and visual impacts.

Comments Received on the RROD Regarding Aesthetics in the Mattaponi River: In their report dated 4 May 2001, the RRWSG submitted comments regarding aesthetics, stating that the pump station structure would be designed in a residential style, would be located approximately 100 feet back from the edge of the river, and would be screened by a forested buffer. The intake lines would be installed using microtunneling technology and would not be visible, and the boathouse and pier would not differ appreciably from other structures on the river. The RRWSG stated that, contrary to the District's claim, the shoreline is not "pristine," as development and logging have occurred along the shoreline and a number of other piers have been constructed.

The RRWSG indicated on page 5-83 of the FEIS that "The pumping station may be visible to boats passing up and down the Mattaponi River in the vicinity of the intake. Any vegetation cleared for construction of the intake line could also disrupt the visual continuity of the shoreline." The District commends the RRWSG for reconfiguring the pump station to reduce its aesthetic impacts on the river as described above. Also on page 5-84 of the FEIS, the RRWSG stated that "...the area appears quite pristine as viewed from the river." The Corps is required to evaluate a project in terms of a number of public interest factors, including aesthetics. More importantly, the Mattaponi River has been evaluated and qualifies as a Virginia Scenic River and is listed as a probable candidate for the Department of Environmental Quality's Exceptional Waters Program (RROD page 119). The District acknowledges that there are a few degraded areas along the shoreline, nonetheless, it remains largely undeveloped.

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One concern that is raised in the RROD is the long-term increase in ambient noise levels resulting from pump station operation. The RRWSG stated on page 5-85 of the FEIS that long-term impacts on ambient noise levels would result from the operation of the pumping stations, but does not quantify the increase. It is unknown at this time what that noise level would be, or whether the measures proposed by the applicant (RROD page 120) would reduce unacceptable levels.

(2) Cohoke Creek: Cohoke Creek is a tributary to the Pamunkey River. According to the 1996 Virginia Outdoors Plan, a segment of the Pamunkey River from Norman's Bridge on Route 614 to the Pampatike Landing near the Route 360 Bridge has been evaluated and qualifies as a Virginia Scenic River. Also, the state has determined that segments of the Pamunkey River from the King William County/Caroline County line to Route 614 and from Pampatike Landing to the York River should be evaluated to determine their suitability as a Virginia Scenic River.

The upland forests, hardwood swamps, emergent wetlands, streams and beaver ponds of the Cohoke Creek watershed possess natural scenic beauty. The area is relatively undisturbed except for silvicultural activities. A dramatic shift in the scenic character of the area would occur from the replacement of this forest/wetland system with a deep-water man-made lake. However, because aesthetic values vary with individual taste, some people may consider the new open-water habitat as an aesthetic resource.

Upon completion of construction, the dam area would be landscaped to minimize visual impacts. Short-term water quality and air quality impacts would occur during land clearing and construction disturbances. Construction activities and transportation of workers and materials to the site would increase noise levels at the reservoir project site. A long-term increase in ambient noise levels would result from the operation of the reservoir pumping station. Odor should be a problem only when the reservoir is severely drawn down and anaerobic sediments are exposed.

m. Historic Resources and Traditional Cultural Properties: Under Section 106 of the National Historic Preservation Act (NHPA), federal agencies are required to take into account the effects of an agency's undertakings on properties included in or eligible for the National Register of Historic Places (National Register). The goal of the Section 106 consultation process is to identify historic properties potentially affected by the undertaking, assess its effects, and seek ways to avoid, minimize or mitigate any adverse effects on historic properties. Historic properties which are issues for this project include pre-historic and historic archaeological sites, historic structures and Traditional Cultural Properties (TCPs). TCPs are defined in National Register Bulletin Number 38, "Guidelines for Evaluating and Documenting Traditional Cultural Properties" as historic properties that are eligible for inclusion in the National Register because of their association with cultural practices or beliefs of a living community that are rooted in that community's history, and are important in maintaining the continuing cultural identity of the community. Since the historic property review for this project also involved a minority population of Native Americans, environmental justice is an interrelated issue, which is discussed in detail in Section 8 t. below.

(1) Archaeology and Architectural Resources: As part of the NEPA review of the project, and as required by Section 106, the RRWSG contracted with MAAR Associates, Inc. to undertake a Phase 1A cultural resource survey, which was conducted in the summer of 1993. A report entitled, "Phase 1A Cultural Resource Survey for the Proposed King William Reservoir, King William County, Virginia and the Proposed Black Creek Reservoir, New Kent County, Virginia," was finalized in January 1994 and was included in the Draft EIS as Appendix G. This survey identified 15 previously unrecorded cultural

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resources in the King William Reservoir project area, and recommended additional research in the form of "Phase IB" intensive systematic field survey. In the summer of 1994, MAAR Associates performed a Phase IB survey of the 2,400-acre King William Reservoir site (a survey of the KWR-I pipeline route was conducted in 1996). A report entitled, "Phase I Cultural Resource Survey for the Proposed King William Reservoir, King William County, Virginia," dated October 1996, documented this archaeological survey, and was included in the FEIS (January 1997) as Appendix G. The survey was performed for KWR-I and found a total of 156 archaeological sites. Of the 156 sites located for KWR-I, eight were outside the impact area, five were located at the site of the pump station and intake pipeline, 19 were located along the outfall pipeline, and 124 were located within the proposed reservoir impoundment. For KWR-IV this survey identified a total of 115 archaeological sites within the area of potential effect (92 in the reservoir, 18 in the outfall pipeline route and 5 at the pump station and along the intake pipeline). Of the 115 total sites for KWR-IV, 72 sites were determined to be potentially eligible for inclusion in the National Register of Historic Places (55 prehistoric archaeological sites within the KWR-IV pool area, 12 sites along the pipeline route and five sites at the intake location). Most of the archaeological sites (120, out of the total of 156 sites identified) were Native American sites, which were temporary hunting/gathering camps or base camps from the Early Archaic period through the Late Woodland Period. In addition to the Native American sites, 43 of the 156 sites had an Euro-American component ranging from the seventeenth through the twentieth century, with most sites falling into the farmstead and/or dwelling category. Industrial or extractive sites included a dam and mill, several ice house pits and a dam and ice house pit complex. This report also discussed architectural resources, and noted that 53 survey forms were completed. Although none of the architectural resources are located within the reservoir pool, a total of 17 properties were considered to possibly be affected visually by the reservoir. It should be noted that the pipeline route surveyed was for KWR-I, and that roughly 21,000 linear feet of the proposed pipeline route for KWR-IV was not surveyed in the Phase I.

In April 1997, the Virginia Department of Historic Resources (VDHR) submitted comments on their review of the October 1996 Draft Phase I Cultural Resource Survey. VDHR concurred with the majority of the recommendations in the report for the sites identified; however, they recommended further work on 20 sites, disagreed with the need for further evaluation on 5 sites (based upon total of 156 sites), and suggested that adjacent sites with the same components need to be evaluated for possible relationships. They also had concerns about effects to archaeological sites located outside the reservoir pool and KWR-I pipeline corridor (i.e., mitigation sites, KWR-IV pipeline route), and provided comments on suggested modifications to the report. The letter also recommended that the District initiate three party consultation pursuant to Section 106 of the NHPA. The draft version of the Phase I Cultural Resources Survey report has not been rewritten into a final version; therefore, VDHR comments are not incorporated as part of the draft Phase I report.

(2) American Indians: The reservoir would be located in a rural area of King William County, between Virginia's only two American Indian Reservations: The 150-acre Mattaponi Reservation on the Mattaponi River with approximately 65 residents (approximately 450 other tribal members do not live on the reservation) and the 1,200-acre Pamunkey Reservation on the Pamunkey River with approximately 75 residents. In addition, the Upper Mattaponi Tribe, although not reservated, has tribal lands (Indian View Baptist Church and Sharon Indian School on two acres and another 30-acre tract nearby) in King William County. These American Indian Tribes are descendants of Native peoples whose archaeological remains date back thousands of years, and are also all descendants of the Powhatan Indians of Eastern Virginia. The Powhatan Indians were distinct ethnic communities (tribes) of Native Americans who were united under the rule of a seventeenth-century paramount chief named Powhatan (the father of Pocahontas). The

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Great Chief Powhatan led the Powhatan Confederacy and ruled most of tidewater Virginia when English colonists arrived in 1607. The present day reservations were originally established by an act of the Virginia General Assembly in 1658 from land long held by the Tribes and are believed to be the oldest in the United States. Despite 17th century treaties, the reservation boundaries have decreased in size due to European colonization and encroachment. All three Tribes were recognized by the Virginia legislature in 1983; however, none of them are federally recognized. (These Tribes have been seeking recognition from the federal government as sovereign nations; however, in January 2001, the Mattaponi and Pamunkey Tribes withdrew from this effort for undisclosed reasons. **In accordance with comments received from the Institute for Public Representation, the Mattaponi Tribe is “still giving serious consideration to the federal recognition process and to whether that is something they wish to pursue.” The Mattaponi Tribe’s withdrawal from the Virginia Council on Indians’ campaign to obtain federal recognition for all of Virginia’s Tribes through congressional legislation does not mean that the Tribe is no longer interested in pursuing federal recognition. Federal recognition can be obtained several different ways, including recognition through congressional legislation or receipt of acknowledgement through the formal Bureau of Indian Affairs process.**) Despite the lack of federal recognition, the Norfolk District has made every effort to keep the Tribes informed and to involve them where appropriate. In fact, on 25 February 1998, my predecessor, Colonel Robert H. Reardon, Jr. signed a Memorandum for the Record regarding the Mattaponi and Pamunkey Tribes. The memo stated, “This is to memorialize for the record my decision of 7 March 1997 to treat the Mattaponi and Pamunkey Tribes as if they were federally recognized Tribes, to the extent that I am permitted to do so by applicable statutes and regulations.”

The Pamunkey Tribe became involved in the project in its very early stages. The Pamunkey Tribe first contacted the consultants who were working on the project in December of 1990 with a letter stating that they were “concerned about the possible effects to archaeological sites which include human remains located in the project vicinity” and indicated that they wanted to be an “interested party” in the consultation process. Mr. Warren Cook, Assistant Chief of the Tribe, was hired to assist in the archaeological studies. At the time, the Pamunkey Tribe **stated that they** represented not only their Tribe, but also the United Indians of Virginia and the Mattaponi Tribe (per letters of September 1993, and November 1993 from the Pamunkey Tribe). **On 23 September 1997, Newport News sent the District a copy of an undated statement, provided by the Pamunkey Tribe, signed by Chief Webster Custalow, indicating that, “the Mattaponi Tribal Government does agree that the Pamunkey Tribal Government will be the lead tribe in working out agreements with all parties as pertains to burial remains and artifacts found in the area of the proposed Cohoke Mill Creek reservoir.” However, the Mattaponi Tribe has asserted that no such agreement existed. The Mattaponi Tribe has stated that they first objected to the project in 1989, and referenced a newspaper article in the 18 October 1989 edition of the Country Courier entitled, “Mattaponi Chief Speaks Out on Reservoir.” The first piece of correspondence regarding this project from the Mattaponi Tribe that the District is aware of, was a letter in March, 1994 from the Mattaponi Chief and Councilmen to the County Administrator of King William County requesting that the project to withdraw water from the Mattaponi River cease and be dismissed. They stated that the native people do not wish to see the ecology of the Mattaponi River disturbed or destroyed. In September of 1996, the District was contacted by the Mattaponi Tribe and informed that the chief, assistant chief, and tribal council were the only official representatives of the Mattaponi Indian Reservation to comment concerning the reservoir matter. The Mattaponi Tribe became very involved in the process from that point on and hired the Institute for Public Representation (IPR), a nonprofit, public interest law firm, to represent them. The Upper Mattaponi Tribe did not become involved until 1997 after accepting an invitation from the District to participate as a consulting party in the MOA process.**

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(3) Public Involvement and Comments: In addition to working with the Tribes, the District involved the general public in the Section 106 process for this project in many ways, including public notices, EIS documents and a public hearing (see Section 5 for details). Comments on the Draft, Supplement to the Draft and Final EIS documents related to cultural resources were received from various parties, including; the Environmental Protection Agency, Virginia Department of Environmental Quality, Pamunkey Tribe, Mattaponi Tribe, Virginia Council on Indians, National Trust for Historic Preservation, Sierra Club, Chesapeake Bay Foundation, West Point Hunt Club Inc., Alliance to Save the Mattaponi, Mattaponi and Pamunkey Rivers Association, King William Historical Society, and King and Queen County.

The letters discussed several issues including: the need to address the likelihood or presence of Traditional Cultural Properties (TCPs), the need for further consultation with the affected Tribes, violation of treaties with the Tribes, and impacts to anadromous fish used by the Tribes. The Pamunkey Tribe and IPR, on behalf of the Mattaponi Tribe, submitted comments on the FEIS, and announced their opposition to the project. The letter from the Pamunkey Tribe also indicated that the United Indians of Virginia were opposed to the project. The letter from IPR on behalf of the Mattaponi Tribe claimed that the District could not issue a section 404 permit for the proposed King William Reservoir project because it violates the Mattaponi Tribe's aboriginal hunting, fishing and gathering rights, it abrogates the Tribe's 1646 and 1677 treaties, and issuance of the permit would violate the Corps' trust responsibility to the Tribe. The letter described the historical background of the Tribe and the many traditions and cultural practices that are still part of Tribal life (i.e., hunting, fishing for subsistence, spiritual traditions that involve the Mattaponi River such as baptisms and Easter services). This letter also indicated that the District did not adequately evaluate the environmental justice consequences of the project; the applicant failed to show that the project would meet the requirements of section 404; the FEIS was inadequate under the requirements of NEPA; and the FEIS failed to address the following potential impacts: potential threat of dioxin contamination, salinity levels in the Mattaponi River and on the shad population, terrestrial habitat and wildlife, and impacts to the Tribe from lost archaeological sites. The Pamunkey Tribe's comments on the FEIS included the following items of concern or objections: adverse effect of the project to archaeological resources, potential impacts to burial sites, inadequate discussion of environmental justice issues, failure of the Commonwealth of Virginia to live up to its trust responsibilities and safeguard the Tribes, inadequacies in the proposed wetland mitigation plan, loss of wetlands and uplands, and potential impacts to the Mattaponi and Pamunkey Rivers. They stated that if the project was permitted they wanted to participate in and be compensated for the archaeological investigations and they wanted the best mitigation plan available.

(4) Traditional Cultural Properties: During the preparation of the FEIS, the District staff learned from the VDHR and the ACHP that there was a need to assess potential impacts to TCPs. Prior to this time, the focus on cultural resources had been on gathering information on potential impacts to archaeological and architectural properties. However, once the District staff was made aware of the need to address TCPs, and the Tribes provided comments on the EIS documents, the District began to meet with the Tribes, VDHR, EPA, ACHP, and the applicant to determine how to address this issue. At the invitation of the Pamunkey and Mattaponi Tribes, former District Commander Colonel Robert H. Reardon, Jr. and several District staff members visited their Reservations in March of 1997. After I assumed command, I also visited the Mattaponi reservation in September 1998.

(a) Consulting Parties: In response to the District public notices and EIS's, several parties became interested in the Section 106 process and requested participation as consulting parties. Over the

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course of several months, various parties were added as consulting parties, with the most recent list including: the District, VDHR, ACHP, City of Newport News, EPA, Mattaponi Indian Tribe (also represented by the Institute for Public Representation), Pamunkey Indian Tribe, Upper Mattaponi Tribe, United Indians of Virginia, Virginia Council on Indians, King William County, Preservation Alliance of Virginia, National Trust for Historic Preservation, and Southern Environmental Law Center. These parties were included in meetings and mailing lists on issues related to the various cultural resource issues.

(b) TCPs and Environmental Justice: After consultation with the VDHR, ACHP and EPA, the District determined that potential impacts to TCPs and environmental justice should be addressed through a study conducted by a qualified ethnographer. The District conducted a meeting of the consulting parties to develop a Scope of Work which would guide the ethnographer in the research of the cultural and spiritual issues related to TCPs. The Scope of Work was finalized in November of 1997. The first ethnographer contracted to perform the study was Dr. Helen Rountree, an anthropologist/ethnohistorian and Professor at Old Dominion University who had studied the Pamunkey, Mattaponi and Upper Mattaponi Tribes for many years. However, in January 1998, due to her unexpectedly large class load, she declined to perform the study. Dr. Kathleen Bragdon, a cultural anthropologist with the College of William and Mary was then selected as the principal investigator for the TCP study, which was begun in the spring of 1998. The TCP study was funded by EPA.

(5) Memorandum of Agreement: While the TCP study was being conducted, the District continued to work on other aspects of the project related to cultural resources. Since the City of Newport News declined to perform the Phase II (evaluation of significance) on the archaeological sites prior to a permit decision, it was determined that a Memorandum of Agreement (MOA) would need to be developed to specify measures to avoid, reduce or mitigate adverse effects on historic properties that are eligible for the National Register. It was known that there were 115 archaeological sites, 72 of which were potentially eligible for the National Register (79 as recommended by VDHR for further work), possible visual impacts to potentially eligible architectural properties, and the issue of the presence of a rural historic landscape. It was clear that the project would have an adverse effect on historic properties. Numerous meetings were held with the various consulting parties to develop an MOA. The stipulations of the draft MOA included: Coordination of Reviews, Identification and Evaluation (archaeological sites, TCPs, standing structures, and rural historic landscapes), Consultation and Treatment (archaeological sites, TCPs, standing structures, and rural historic landscapes, curation of archaeological materials, human remains and associated artifacts), Discovery Provisions, Public Involvement, Dispute Resolution and Administrative Provisions. It was recognized that the identification of all historic properties would not be completed until after execution of the MOA, and that there were still areas that would need identification surveys for historic properties (i.e., the outfall pipeline route, wetland mitigation sites, staging areas for construction equipment). Therefore, the purpose of the MOA was to address what actions would be taken to resolve the adverse effects of the reservoir project on historic properties. Treatment plans for particular archaeological sites were to be developed after further investigations and eligibility determinations were completed.

There was much concern by the Tribes about the recovery of archaeological materials, and especially, human remains. Although no burials were located during the Phase I identification survey, more extensive excavations at the Phase II survey level could reveal the presence of human remains. After much discussion, it was determined that if the project was constructed, archaeological materials would be permanently curated by VDHR; however, all Native American artifacts would belong to the Tribes. It

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was decided that American Indian skeletal remains and associated artifacts, would be reinterred as determined by and in a location as agreed upon by the Pamunkey Tribe, the Mattaponi Tribe, the Upper Mattaponi Tribe, in consultation with the United Indians of Virginia and the Council on Indians. It should be noted that not all parties concurred with the stipulations in the draft MOA. In particular, the Mattaponi Tribe stated that they could not accept plans to disturb burial sites of their ancestors and suggested that the MOA should state that human remains would be left undisturbed by reconfiguring the project design. In their letter of 2 May 2001, the Pamunkey Tribe reiterated their concerns about the archaeological sites, stating “We are justifiably concerned about the adverse effect of this project to archeological sites that surround the proposed location for the Cohoke Mill Creek Reservoir. The position of the Pamunkey Indian Tribe is that we do not want anyone to come in and destroy the Historical sites in King William, Virginia. We do not want any physical destruction, damage or alteration of all or part of this historic, sacred, cultural, spiritual land.” These same concerns were expressed in the Pamunkey Tribe’s July 1997 comments on the FEIS.

Another issue of concern was related to the archaeological sites that were not recommended for further work either in the Phase I report, or by VDHR. The treatment of these sites was determined to be independent of the Section 106 review since they were not considered “potentially eligible” for the National Register. However, the Mayor of Newport News had made a commitment to the Tribes in March of 1997, stating, “the City does hereby commit to investigation of all 92 cultural resource sites found within the flooded area of the proposed smaller reservoir (dam site IV).” The treatment of these sites was included as a “Whereas clause” in the draft MOA, and attached as a separate document. Mitigation for TCPs also needed to be included in the MOA, but this could not be accomplished until after the TCP report was finalized and discussions with the Tribes were conducted.

(6) “Powhatan’s Legacy”: The first draft of the TCP report, ““Powhatan’s Legacy’: Traditional Cultural Property Study for the Proposed Regional Raw Water Study Group’s Water Supply Reservoir, King William County, Virginia” (“Powhatan’s Legacy”) was received by the District in August, 1998. As had been agreed, the report was sent to the Pamunkey, Mattaponi, and Upper Mattaponi Tribes for their review. In addition, since the Tribes had requested confidentiality of the report, the District wrote to the National Park Service (NPS) in August, 1998 requesting the concurrence of the Secretary of the Interior that public disclosure of the TCP report would cause a “significant invasion of privacy” pursuant to Section 304 (a) (1) of the NHPA. The NPS responded in January of 1999 that they could not concur with our intention to withhold the report from public disclosure pursuant to Section 304. The NPS concluded that based upon available information, they did not see how the public release of the report would cause significant invasion of privacy, risk harm to historic resources, or impede the use of traditional religious sites. However, the District agreed to honor the Tribes request for confidentiality to the maximum extent provided by the Freedom of Information Act (FOIA). Due to the necessary Section 106 coordination, certain parties (Tribes, ACHP, VDHR, EPA, and the City of Newport News) were afforded an opportunity to review and comment on the “Powhatan’s Legacy” report. The second draft of the TCP report, received in October of 1998, was made available in January of 1999 to the parties mentioned above.

(a) Newport News Comments on TCP Report: The City of Newport News reviewed the draft TCP report at the District offices in January 1999 and sent in a letter which questioned the validity of the report, due to a perceived bias. They stated that some of the chapter summaries and other parts of the report appeared to describe the opinions and beliefs of the investigators, rather than Indian Tribes or individuals, as to effects of the reservoir project on TCPs and on Virginia Native Americans in general.

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They also questioned whether Dr. Danielle Moretti-Langholtz, one of the contributors to the TCP study, was able to separate her personal views from her professional duties in the conduct of the TCP study, and mentioned her March, 1997 personal letter to the District commenting on the FEIS before she was involved in the study. Due to the high volume of letters received against the reservoir and the length of time between receipt of her person letter and her appointment by Dr. Bragdon as a contributor to the investigation, the District staff did not make the connection. The City of Newport News' letter urged the District to carefully consider the extent to which the TCP report was tainted by the biases and pre-judgments of one of the principal authors. As a result of Newport News' letter, VDHR commented that because Dr. Moretti-Langholtz's comment letter creates the appearance that the report might be biased, the District should "...take steps to strengthen the perception of objectivity" of the report.

Therefore, the District conducted a full investigation of the validity of the alleged bias. Both Dr. Kathleen Bragdon and Dr. Moretti-Langholtz responded in writing to the Newport News allegation and met with my staff and me to discuss the report. Because EPA had funded the study, they initially suggested their archaeologist, John Vetter to review the TCP report; however, he declined to perform the work. Mr. Timothy Thompson, a Norfolk District Corps of Engineers archaeologist, was tasked to review the TCP report. Both VDHR and ACHP were consulted and neither objected to the District's selection of Mr. Thompson to perform this review. Mr. Thompson concluded that reliable data was gathered using a standard anthropological methodology and the conclusions of the researchers were consistent with the data. I am satisfied that Dr. Moretti-Langholtz acted in a professional manner and did not allow any personal views about the reservoir project to influence the work she performed for the District. Therefore, in April 1999, I wrote to Newport News stating that I had concluded my review of the matter and determined that the allegation of bias was unwarranted. I informed the City that I was satisfied that I could use the report to make a fair and informed evaluation of the effects of the project on TCPs.

(b) Other Comments on TCP Report: Comments on the "Powhatan's Legacy" report were also received in March 1999 from ACHP, VDHR, the Pamunkey Tribe and IPR, on behalf of the Mattaponi Tribe. IPR stated that they commended the overall comprehensiveness of the draft report, but believed that some important issues were not discussed. They made the following suggestions: inclusion of traditional cultural uses of Cohoke Valley wetlands, treatment of the entire Cohoke Creek area as an historic district, and the preparation of a supplemental questionnaire. The Pamunkey Tribe stated that the use of wetlands has always been a significant part of the way of life of the Pamunkey People and provided information on the significance of fishing and the Pamunkey Fish Hatchery to their culture. They also submitted a document entitled, "Searching for Virginia Company Period Sites: An Assessment of Surviving Archaeological Manifestations of Powhatan-English Interaction, A.D. 1607-1624, Study Unit 10: Gloucester, King and Queen, and King William Counties," for inclusion in the TCP report.

ACHP stated that in general they found the TCP Report helpful, but recommended that the final report provide further detail on how traditional cultural properties would be affected by the reservoir, and what kinds of measures may be needed to mitigate against adverse affects. VDHR stated that their archaeology subcommittee of their National Register Evaluation Team met to consider the eligibility of the TCPs, and agreed that all five TCPs were potentially eligible. However, they stated that the level of detail was not sufficient for them to determine conclusively that the properties met the criteria for inclusion on the National Register. They recommended further development of property descriptions for the final report. In April of 1999, the District wrote to the TCP author regarding the comments received and recommended several minor additions or clarifications to the report.

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(c) Final TCP Report: The consultant submitted the final TCP report, "Powhatan's Legacy" in September 1999, incorporating the applicable comments provided on the draft. The study provided a historical review of the "Powhatan Indians of Eastern Virginia" from the late sixteenth century, and described the present day culture. The authors used both quantitative and qualitative methods to gather data on the Indians' perspective. They conducted formal and informal interviews with individual members of the Mattaponi, Pamunkey and Upper Mattaponi Tribes, and developed a questionnaire, in consultation with the Tribes. The questionnaire was designed to focus questions on the attitudes of the tribal membership and the pertinent cultural lifeways which could be most directly impacted by the reservoir project. A total of 98 questionnaires were returned: 51 individuals from the Mattaponi, 19 families from the Pamunkey and 28 individuals from the Upper Mattaponi.

The report identified five Traditional Cultural Properties: the Pamunkey River and its wetlands; the Mattaponi River and its wetlands; the Pamunkey Reservation including the Pamunkey Fish Hatchery; the Mattaponi Reservation including their Shad hatchery; and all potentially National Register-eligible archaeological sites within the project area associated with the Powhatan peoples. These TCPs are argued as part of the larger ethnographic landscape of the Pamunkey Neck, which has a distinctive rural character. The Pamunkey and Mattaponi Rivers are described as vital to the Tribes for subsistence, and essential to their historical and cultural identity, and the Mattaponi River is considered the "lifeblood" of the Mattaponi community. In regard to the Mattaponi and Pamunkey Reservations, the TCP study reported that they are the only two Indian reservations in Virginia, "and of less than a dozen surviving reservations in the eastern United States." The report concluded that the reservations are valued for their historic and cultural associations and as the center of Indian life for each Tribe. The archaeological resources were previously researched during the Phase I survey; however, the TCP report stated, "their (Native American archaeological sites) importance to the Native community goes beyond what their excavation might tell us." The report indicated that the Tribes recognize that the prehistoric archaeological sites provide "a centuries deep connection to the prehistoric occupation of the region," and that the "Mattaponi specifically note that they do not wish these sites disturbed."

The research described the Tribes as having a connection to the land and rivers of the Pamunkey Neck that provides an important link to their ancestors as well as a legacy to their descendants. The report stated, "the proposed project is expected to impact the Indian communities, their reservations, and the surrounding buffer area in a number of ways, all of which will have a negative impact on community cohesiveness, and on the historic and cultural character of the TCPs." These effects include: direct changes in the Mattaponi River and indirect changes in the Pamunkey River and their associated wetlands, which would affect the plant and animal communities and the people that depend on them; changes in the rural character of King William County due to increased recreational and residential use of the rivers and reservoir, and further isolation of the two reservations by the physical barrier of a reservoir; potential impact on future plans of the Mattaponi and Pamunkey Tribes for an expansion of their land base to further protect their heritage; negative effect on the morale and status of the Indian community of Virginia as a whole; and inundation and/or excavation of prehistoric archaeological sites which have great emotional and symbolic significance to the Tribes causing significant disturbance in the Indian community and possibly impacting their quest for federal recognition. The report stated "...if this project is undertaken it will have harmful effects on the Indian people and their culture. All Indian people we have consulted and surveyed insist that this project should not be undertaken." The author's reasons for this recommendation are summarized as follows: the area of potential effect for the proposed reservoir includes the "cornerstone" of surviving traditional native culture in Virginia; changes to the rivers would be irreversible, as would their effects on the Tribes; the area of potential effects contains sites of sacred

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importance to the Tribes; and the archaeological sites affected by the proposed reservoir are of great cultural and symbolic significance to the Tribes, and most tribal members do not want the sites disturbed. The Tribes would not discuss compensation of the impacts on these TCPs; therefore, the author was not able to include suggested mitigation measures in the report.

(7) Mitigation for Impacts to TCPs: At a meeting with the consulting parties on 1 April 1999, the TCP report was discussed as well as a draft document prepared by the District entitled "Traditional Cultural Properties: Determination of Eligibility and Evaluation of Effects of the King William Reservoir" that applied the National Register Criteria to each TCP and listed the potential effects of the project on each TCP. All parties present were asked for their input and the District finalized the document on 6 April 1999 to incorporate these comments. Each TCP was found to meet one or more of the National Register criteria. In accordance with 36 CFR 800 and 33 CFR 325 Appendix C, an historic property will be treated as eligible for the National Register if both the SHPO and District agree that the property is eligible. At this meeting, the District, VDHR, ACHP, Newport News and the Tribes agreed to consider the TCPs "potentially eligible"; however, there was disagreement as to the effects of the project on TCPs. Newport News believed that the effects were "perceived" rather than "real," and the Tribes firmly believed that the impacts were real. Newport News was very concerned about the need to move the project forward and to discuss potential mitigation measures.

Earlier in the project, Newport News had met on their own with the individual Tribes to try to arrive at an agreement whereby the Tribes would withdraw their objections to the project in exchange for monetary compensation. Although the Upper Mattaponi Tribe seriously considered the City's proposal, none of the Tribes consented to sign such an agreement. In March of 1999, Newport News drafted a proposal to establish the "Powhatan's Legacy Foundation" to "mitigate the adverse effect perceived by the Native Peoples on TCPs associated with the King William reservoir project, and to provide a vehicle for the Tribes to protect and maintain their traditional cultural values." Newport News proposed to provide 1.5 million dollars to the foundation, to be distributed equally to the three Tribes. As part of the agreement, Newport News proposed certain measures to protect the natural environment, provide ongoing assistance to the foundation, and involve the Tribes in the archaeology research and curation. The Tribes did not accept this proposal, and requested confidential discussions of any mitigation for TCPs with only the essential consulting parties attending the meetings. Therefore, arrangements were made to meet with each of the Tribes individually in May 1999, and the Tribes were requested to provide a list of possible mitigation measures prior to the meetings.

Accordingly, all three Tribes presented a list of potential mitigation measures which they requested to be kept confidential. The Upper Mattaponi Tribe provided their list in April of 1999, and requested that the measures be held in strictest confidence by all parties involved. The Pamunkey Tribe submitted a letter to the District with their suggested mitigation measures for the TCPs in April 1999. The letter stated that the Pamunkey Tribal Government has always opposed and still opposes the proposed King William Reservoir; however, they wanted the best possible mitigation plan if the Corps approved the project. In May 1999, IPR submitted the Mattaponi Tribes' TCP mitigation proposal to the District. The Mattaponi Tribe reemphasized their belief that no measures could ever fully mitigate the adverse effect of the King William Reservoir on the Tribe's historical and cultural resources. The Tribe also indicated that they were only providing the suggested mitigation measures because they felt forced into the situation, and they feared that by not participating, the Tribe would run the risk that the reservoir would be built with no compensatory mitigation. IPR also arranged for confidentiality agreements to be signed by Newport

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News and the District. I agreed not to divulge the information presented in the mitigation meeting to the extent permissible by law and signed the agreement in May 1999.

On 13 May 1999, meetings were held separately with the Pamunkey and Upper Mattaponi Tribes to discuss possible mitigation measures for impacts to TCPs. The meetings were attended by representatives of the respective Tribes, the District, VDHR, ACHP, EPA, and Newport News. For both of the Tribes, Newport News agreed to review their suggested mitigation, provide a counter offer, and attend a second meeting to discuss the mitigation. On 22 May 1999, a meeting was held to discuss mitigation measures for impacts to TCPs with the Mattaponi Tribe. The meeting was attended by representatives of the Mattaponi Tribe, IPR, the District, VDHR, EPA, and Newport News. The Mattaponi Tribe suggested mitigation for impacts to TCPs and Newport News requested cost estimates for some of the mitigation proposals, and indicated they would submit a counter offer. Also at this meeting, IPR read a statement discussing a unique sacred site within the Cohoke valley which is of great traditional and religious importance to the Tribe. The Tribe indicated that they were extremely reluctant to discuss the sacred site with outsiders unless absolutely necessary, and only revealed the existence of it when the Tribe felt it had no choice if the site were to remain undisturbed. The Mattaponi Tribe requested that the District seek protection for the information under Section 304 of the NHPA. The District requested a written statement in order to have something to present to the NPS for protection.

(8) Suspension of Section 106 Coordination: On 4 June 1999, I sent a letter to Newport News to inform them of my preliminary position to deny their request for a Department of the Army Permit to construct the King William Reservoir. With the District's preliminary position of denial, there would be no federal undertaking for further consultation under Section 106; therefore, the Section 106 process was discontinued. Newport News objected to this action and recommended that we continue the discussions of mitigation for TCPs and complete the MOA. In June 1999, Newport News submitted "confidential" counterproposals to each of the Tribes regarding mitigation for the TCPs, and stated that the offer "should be regarded as the City's best and final financial proposal." IPR sent a response for the Mattaponi Tribe stating that the Tribe saw no reason to continue discussing cultural resource mitigation proposals at this time. The Pamunkey Tribe indicated that further discussions of the mitigation should await Newport News' appeal of the final Corps' decision if the permit is denied. The Upper Mattaponi did not respond to Newport News' letter.

(9) Discussion on Appropriate Mitigation Measures: **Newport News' mitigation offer of 18 June 1999 to each of the Tribes included both a "Universal Plan" and a "confidential annex." The Universal Plan included the following elements:**

- 1) Minimize the potential for salinity impacts on fish, wildlife and plants;**
- 2) Enable tribal members to monitor water withdrawal from the Mattaponi River and to participate in assessing ongoing project effects;**
- 3) Enhance protection of the shad fishery in the Mattaponi River;**
- 4) Avoid an increase in public access to the Mattaponi River;**
- 5) Provide for protection of or data recovery from all Native American archeological sites within the APE of the project;**
- 6) Provide for the respectful treatment of any human remains and associated objects found during archeological work and construction;**
- 7) Assist the Tribes in educating both school age children and the general public about the history of the Native American Tribes in Virginia, as well as contemporary issues affecting Native Americans throughout our culture.**

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Due to the Tribes requests for confidentiality, the confidential annexes will not be addressed in this document. It should be noted that there were substantial differences in the proposals submitted by each of the Tribes and the counteroffers submitted by Newport News. Newport News has made statements indicating that they and the Tribes were close to a resolution on appropriate mitigation measures. However, based upon discussions at the various meetings and statements contained in letters received from all parties, it did not appear there would be concurrence between the Tribes and Newport News. Although there were areas where Newport News and the Tribes agreed (i.e., additional Tribal lands, museums, cultural centers, grantsmanship assistance, etc.), the monetary amounts offered by Newport News were far less than the Tribes requested. There were also several measures requested by each Tribe that Newport News did not agree to fund or incorporate. The monetary differences alone between the Tribe's requests and the offers by Newport News are significant, with all of the Tribes requesting millions of dollars more for mitigation measures than Newport News was prepared to offer.

(10) Sacred Site: On 30 June 1999, IPR submitted a letter on behalf of the Mattaponi Tribe discussing the "sacred site." The District contacted the NPS seeking concurrence that the 30 June letter should be withheld from disclosure to the public pursuant to Section 304 of the NHPA, and in July 1999, the NPS responded that they concurred with our intent to withhold the document from the public. Due to the Tribes' request for confidentiality, and the Section 304 protection provided, the specifics of the sacred site will not be discussed in detail in this document. However, the 30 June 1999 letter is part of the administrative record and will be made available within the Corps' chain of command for decision-making purposes.

The City of Newport News questioned the validity of the sacred site and asked the District to conduct further investigations and consultations on the site. Although there is no historical documentation on the specific location of the sacred site mentioned by the Mattaponi Tribe, there are historical records which validate the potential existence of such a site. In addition, conversations with VDHR and ACHP have indicated that oral history in the American Indian culture is very reliable. The District has confirmed with the authors of the TCP report that they learned of the sacred site from more than one individual during their research for the TCP study, but were requested not to include any information on spiritual, religious or ceremonial practices in the report due to concerns that the information might be released to the public. Newport News also indicated in their letter of 21 September 1999 to the NPS that information about the sacred site had already been released by a member of the Mattaponi Tribe. However, Newport News has provided no evidence that any public statements made were a release of the same type of information or level of detail provided in the 30 June 1999 letter.

The District has accepted the Mattaponi Tribe's statements concerning the sacred site, and has not pursued the validity in depth due to the Tribes' request for confidentiality and the fact that no further Section 106 consultation is necessary at this time. Although the site was not discussed in the TCP study, the District believes it would be considered a TCP, at least as another archaeological site. The District informally consulted with ACHP and VDHR on the sacred site issue and in memos dated 17 September 1999 and 21 September 1999, documented the concurrence of both agencies that the District's handling of the situation was appropriate. It should be noted that my preliminary position to deny the permit was made before I had any knowledge of the existence of the sacred site; therefore, it was not the issue that tipped the balance toward my preliminary position of denial as alleged by Newport News. Should it become necessary in the future for the District to continue evaluation of TCPs for permit issuance, further consultation on the sacred site would be necessary.

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(11) Rebuttal Reports Submitted by Newport News: In August of 1999, the City of Newport News submitted two reports to the District: "Cultural Resources Issues Summary" prepared in response to the District's 4 June 1999 preliminary denial letter; and "Supplemental Report on Cultural Resources Issues" a confidential report addressing TCP mitigation and attempting to rebut the existence and/or significance of the sacred site.

The "Cultural Resources Issues Summary" did not contain any new information, rather, the report restated the City's position that they have been very accommodating to the Tribes, that any adverse effects resulting from the project could be adequately mitigated, that federal historic preservation laws present no bar to the issuance of a permit, and that mitigation measures have been successfully used in other similar situations. The District agrees that the City of Newport News has been willing to cooperate with the Tribes; however, there were still areas of apparently irreconcilable disagreement between the Tribes and Newport News, with appropriate mitigation measures being one of the most notable issues. Section 106 requires the District to "take into account" the effect to historic resources, and the law does not suggest that projects must be denied based on impacts to cultural resources. However, there is nothing to preclude the denial of a project based partially or wholly on adverse impacts to historic properties. The reservoir project would result in adverse effects on historic properties, an issue that was considered in the combined impacts of the project. Mitigation agreements to compensate for TCP impacts in other projects do not necessarily apply to the proposed King William Reservoir project.

On behalf of the Mattaponi Tribe, IPR submitted a rebuttal to the City's summary report in a letter dated 14 January 2000. The letter stated that the Mattaponi Tribe had not accepted Newport News's proposed mitigation plan and that they believed the District's procedures were in compliance with the Section 106 consultation process. The Tribe restated their belief that the excavation of vital archaeological resources would result in an unacceptable and irretrievable loss to the Tribe, there is a strong likelihood that the project would negatively impact the shad population, the Tribe's traditional hunting and gathering practices would be severely impacted, the Tribe's traditional religious practices and traditional ways of life would be compromised, and that there would be disproportionate impacts to Native Americans resulting from the project location. IPR also noted cases where mitigation had been rejected by other tribes due to project impacts.

The City of Newport News' "Supplemental Report on Cultural Resources Issues" contained the same information on the sacred site that the Mattaponi Tribe had revealed to the District and the City at the 22 May 1999 meeting as well as other information on the site, including possible geographic locations. Therefore, the District also sought protection of this document under Section 304 of the NHPA. In a December 1999 letter, the National Park Service concurred with the District's intention to withhold this document as well.

On behalf of the Mattaponi Tribe, IPR submitted a response to the City's Supplemental Report on November 30, 2000. Without revealing any details about the site, the following summarizes the two documents. Newport News alleged that the Mattaponi Tribe revealed the sacred site as "a last-ditch attempt to promote the particular agenda of the Tribe and its allies." However, the Mattaponi contend that Tribe never wanted to reveal the existence of the sacred site, and only decided to reveal the secret "when faced with the untenable choice of either disclosing the site's identity and risk its desecration by pothunters and profiteers or failing to mention it and risk its loss." IPR cited National Register Bulletin 38 which discusses the reluctance of Native American's to reveal information on sacred sites, "The need to reveal information about something that one's cultural system demands be kept secret can present

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agonizing problems for traditional groups and individuals.” **The City of Newport News does not see any reason that the Mattaponi Tribe would have unique (or superior) knowledge of the sacred site, and if any tribe were to have unique knowledge of the site, the historical evidence suggests it would most likely be the Pamunkey Tribe.** Newport News stated their belief that only the Pamunkey Tribe should be responsible for the sacred site. However, IPR indicated that all six of the original tribes of the Powhatan Nation have an equal responsibility for the site.

Newport News also questioned why there is no corroboration from other Virginia Tribes about the site. The Mattaponi Tribe believes that this is not a legitimate basis for questioning their oral history. Other tribal communities may have their own reasons for declining to disclose information about the site. Newport News suggested that the sacred site could simply be relocated. However, the Mattaponi Tribe contends that moving the site “...is wholly inconsistent with the Tribe’s spiritual practices and traditional beliefs, would destroy the spiritual integrity of the site, and would undercut the cultural identity of the tribe itself.”

In their report, the City of Newport News attempted to discredit the Mattaponi tribal historian, Dr. Linwood Custalow by making statements about his motives, indicating that he had already released details about the sacred site in public forums, and suggesting that his information regarding the sacred site had been obtained from a published document. The Mattaponi Tribe objected to these attacks on Dr. Custalow’s integrity and provided a summary of his qualifications and service to the community. It should be noted that the statements from public meetings attributed to Dr. Custalow by the City of Newport News do not contain details of the sacred site. Furthermore, the District has not been provided with any documentation to support the City’s allegation that any such public release of details on the sacred site by Dr. Custalow has actually occurred. The Mattaponi Tribe suggested that the similarity between Dr. Custalow’s accounting and published information is corroboration of oral history rather than plagiarism of modern documentation. As stated above, neither the District staff, ACHP or VDHR found any reason to reject the Mattaponi Tribe’s oral history concerning the sacred site.

(a) Newport News Request for Continuation of Section 106 Review: In addition to the reports, Newport News wrote several letters to the District expressing their opinion that suspension of the MOA process and TCP mitigation discussions was contrary to the Corps’ Section 106 regulations. In October 1999 the District met with Newport News and their representatives to discuss this issue. At the meeting, and in subsequent letters dated 15 October 1999 and 17 November 1999, I informed Newport News that because of my preliminary position of denial, suspension of the Section 106 process was the correct action in this case, and that concurrence had been received from both VDHR and ACHP that the District was acting properly.

(b) Additional Newport News Comments on TCP Report: Although Newport News appeared willing to accept the TCP report after the District investigated the alleged bias issue, they later asked the District to disregard it. In a letter dated 31 May 2000, the City of Newport News claimed that it would be a serious error for me to form an opinion on the effects of the project on TCPs based on the Final TCP report. The City claimed that their consultant, Dr. Thomas King, is more qualified to evaluate the effects of the project on TCPs than the District staff. The City provided Dr. King’s critique, which alleged that the TCP report is seriously flawed as evidenced by the authors’ failure to follow the Scope of Work, failure to follow applicable procedures and criteria established by law and specified in the scope of work, and their inability to keep their individual biases out of the document. It should be noted that both the City of Newport News and Dr. King reviewed the Draft TCP report in January of 1999, and along with

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other parties, were given an opportunity to comment. The only issue the City raised at that time was the alleged bias of the authors. Dr. King's criticisms on the procedures would best have been raised during the joint development of the Scope of Work or while the report was in draft form.

In a letter dated 21 November 2000, Dr. King submitted a second letter to the District on behalf of the City of Newport News commenting on Mr. Thompson's review of his critique of the TCP Report and on the District's 6 April 1999 document entitled, "Traditional Cultural Properties: Determination of Eligibility and Evaluation of Effects of the King William Reservoir." In a summary of his opinions, Dr. King advised me that, "In a nutshell, the documents suggest to me that you have been rather poorly advised about both Section 106 and the conduct of 'traditional cultural properties' studies."

Dr. King stated his belief that the authors of the TCP report exceeded their Scope of Work since "they were not directed to make an independent analysis of impacts that the District could use in lieu of making its own analysis." I have conducted my own review of the numerous environmental impacts of the project, and the Tribe's opinions on the adverse effects to TCPs were considered along with all other impacts of the project. Since I considered, but did not use the authors' analysis of impacts in lieu of the District's review, I disagree with the implication in Dr. King's statement. Although he did agree with some of Mr. Thompson's comments, Dr. King stated that there was not enough support for some of his conclusions. Dr. King again questioned Mr. Thompson's qualifications, this time based upon some informal remarks in an e-mail message to the District's project manager. There appears to be a difference of professional opinion between Dr. King and Mr. Thompson with regard to many issues of the TCP report, most notably, whether or not the authors were biased. As indicated above, the District had fully addressed the issue of bias and was not convinced by Dr. King's arguments to reevaluate the issue.

In his critique of the District's 6 April 1999 document addressing eligibility and effects on TCPs, Dr. King disputed the criteria used for some of the TCPs, but did note that all consulting parties had agreed to treat all these properties as eligible for the National Register. Dr. King agreed that the listing of perceived adverse effects "generally tracks the discussion at the 1 April 1999 meeting"; however, he claims that the District's project manager who chaired the meeting had used words such as "nebulous," "minimal," and "remote" to characterize some of the listed effects. While the District does not have a verbatim record of the meeting and cannot confirm or deny that these words were used, the exact context in which they were used would be necessary for a true interpretation of their meaning. Finally, Dr. King criticized the District for not distributing the 6 April 1999 document after consultation was suspended.

Norfolk District's archaeologist, Mr. Tim Thompson, was tasked to review Dr. King's comments and to determine if any of the allegations were valid. In a 6 December 2000 memo entitled "Further Review of King William Reservoir TCP Report," Mr. Thompson concluded that the TCP report had been prepared in accordance with both the Scope of Work and with applicable procedures and guidelines. He stated that the TCP report outlined how the tribes believe the TCPs might be affected and contains sufficient information for the District to determine eligibility for the National Register. As even Dr. King admits, there has been no objection to either the identification of the TCPs or their potential eligibility for the National Register. As the bias issue had been addressed in depth by the District, it was not discussed any further.

I have determined that the TCP report accomplishes the primary purpose of the TCP study, which was to identify TCPs. I have reviewed all of the recent information provided by the City of Newport News and

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nothing contained in it has persuaded me to change my position regarding the impartiality of the TCP authors or the project's adverse impacts to cultural resources.

(12) Impacts to Cultural Resources: It is undisputed that the project would have an adverse effect on historic resources. My June 1999 preliminary position of denial was based in part on impacts to these resources, including TCPs. As proposed, the project would cause flooding or excavation of 115 archaeological sites, 79 of which VDHR recommended for further evaluation. The vast majority of the sites (66) are Native American base camps or temporary camps. There are also an unknown number of sites which may be impacted by pipeline routes, wetland mitigation sites, and construction staging areas which have not yet undergone archaeological investigations. The Phase I report states, "The Cohoke Creek valley Native American site resources base is excellent. There will probably be a fairly large number of significant sites affected by the project." The Pamunkey and Mattaponi Tribes have indicated that the archaeological sites are of great importance to their culture, and the Mattaponi have stated that these sites are also of religious importance. In addition, the Mattaponi Tribe has stated in a letter of July 25, 1997, "Flooding the area, even if those remains that have been identified are excavated, would result in an unacceptable loss to the Tribe. Perhaps most important, the Tribe considers any burial grounds to be sacred resting sites, not to be disturbed." The sacred site revealed by the Mattaponi Tribe also has the potential to be of significance to the sciences of archaeology and anthropology. The Tribes have indicated that no mitigation measures would be adequate to compensate for the loss to their culture. In addition to the archaeological sites, there are potentially eligible historic structures and a potential rural historic landscape that must be evaluated for effects, including viewshed analysis.

It should also be noted that in the course of developing the MOA, the presumed course of action for all archaeological sites within the KWR-IV reservoir was data recovery, due to the applicant's inability to further redesign the flood pool or preserve the sites in place. In May of 1999, the ACHP published a notice of guidance in the Federal Register as an attachment to the revised "Protection of Historic Properties" regulations. One part of the guidance entitled, "Resolving Adverse Effects Through Recovery of Significant Information From Archaeological Sites," recommends considering and addressing several issues when recovery of significant information is the recommended course of action. Several of the issues listed are pertinent to this project, including the following: (1) the archaeological site should not be likely to contain human remains or associated funerary objects, sacred objects or items of cultural patrimony; (2) the archaeological site should not have long-term preservation value, such as traditional cultural and religious importance to an Indian Tribe; and (3) the Federal Agency Official should determine that there are no unresolved issues concerning the recovery of significant information with any Indian tribe that may attach religious and cultural significance to the affected property. These issues would indicate that data recovery may not be appropriate in this case, and that if the Section 106 process is resumed, further discussions with the Tribes would be necessary before data recovery plans are developed pursuant to the draft MOA.

Traditional practices and beliefs and cultural identity were difficult subjects for the Tribes to discuss with outsiders; however, because of their decision to cooperate, the District was able to fully consider cultural and social issues, identify impacts and discuss potential mitigation measures with direct input from the affected community. The final "Powhatan's Legacy" report identified five Traditional Cultural Properties: the Pamunkey River and its wetlands; the Mattaponi River and its wetlands; the Pamunkey Reservation including the Pamunkey hatchery; the Mattaponi Reservation including the Mattaponi hatchery; and all potentially National Register-eligible archaeological sites within the project area associated with the Powhatan peoples. The report indicates that the reservoir would harm the Native American Tribes and

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their culture through both direct and indirect effects. The Tribes state that the reservoir would destroy their way of life through the loss of hunting, gathering and fishing habitat, by changing the rural setting from increased residential growth around their reservations, and by severing ties to their ancestors and to a sacred site within the Cohoke valley when the archaeological sites are excavated or flooded. Mitigation for TCP impacts was explored, but not finalized. Further, there are no standard practices for mitigation of this kind. However, I have concluded that the Tribes cannot be fully compensated for the losses to their spiritual connections, culture and traditional socioeconomic practices that they would experience as a result of the construction of the reservoir and the withdrawal of water from the Mattaponi River. (For a detailed discussion of historic resources issues, see the District's report entitled "Historic Resources and Traditional Cultural Properties Consultation for the King William Reservoir Project." Also, the District's chronology of Section 106 coordination appears as "Chronology of Section 106 Coordination and Environmental Justice Issues for the Regional Raw Water Study Group Permit Application.")

(13) Comments Received on the RROD Regarding Historic Resources and Traditional Cultural Properties: Comments supporting the District's recommendation of denial were submitted by the following:

Jim McClellan, Ph.D.
National Association of Social Workers
Virginia Chapter of the Sierra Club
American Rivers
Pamunkey Indian Tribe
EPA
Chief Webster Little Eagle Custalow (of the Mattaponi Tribe)
Dr. Linwood Little Bear Custalow (of the Mattaponi Tribe)
IRP, on behalf of the Mattaponi Tribe
Southern Environmental Law Center

Comments objecting to the District's recommendation of denial were submitted by:

City of Newport News (on behalf of RRWSG), Comments to Norfolk District, U. S. COE
Recommended Record of Decision (RROD): March 20, 2001 and IWR Special Study:
March 1, 2001, Historical/Cultural Resources and Environmental Justice, 4 May 2001
Greater Peninsula Now, Inc.
James S. Gilmore III, Governor of Virginia
Dr. Thomas King (cultural resources consultant to Newport News)
David Dutton (President of Cultural Resources, Inc., archeological consultant for Newport News)
George Somerville (attorney for Newport News)
Donald Rice (Newport News Waterworks employee)
Nancy Howard (Newport News Waterworks employee)
Mayor Joe Frank (Mayor of Newport News)
David Morris (Newport News Waterworks Planning and Programs Manager)
Ed Maroney (Newport News City Manager)
Councilwoman Mamye BaCote (Newport News City Council)
Charles Allen (Vice Mayor of Newport News)

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Most of the commenters in support of the information in the RROD simply stated their position of support and provided their own additional comments to support the District's position. Issues emphasized included; the requirements of NEPA to include impacts to historical and cultural factors, concern about the archeological sites previously identified and those yet to be located, the spiritual importance of the rivers to the Tribes, flooding of sacred grounds by the reservoir, violation of the buffer zone of the Treaty of 1677, availability of alternatives to the reservoir construction, and a lack of adequate mitigation for impacts to the Tribes. The Pamunkey Tribe submitted a letter that restated many previous comments and reemphasized that the Tribe does not want any physical destruction, damage or alteration of all or part of the historic, sacred, cultural, spiritual land in the vicinity of the proposed reservoir. IRP, on behalf of the Mattaponi Tribe, requested two amendments to the cultural resources section of the RROD. One was related to the statement concerning the withdrawal of the Mattaponi Tribe from the Virginia Council on Indian's campaign to obtain federal recognition. The letter concurred that the statement is correct, but requested that the RROD be amended to reflect that the Mattaponi Tribe is "still giving serious consideration to the federal recognition process and to whether that is something they wish to pursue." The second issue is regarding the assertion in the RROD that the Pamunkey Tribe represented the Mattaponi Tribe on issues related to the reservoir from 1990 to 1994. The Mattaponi Tribe has stated that they do not believe any such agreement existed. The Final RROD has been revised in both cases to reflect the Mattaponi Tribe's comments.

The Virginia Council on Indians submitted a comment letter to the North Atlantic Division dated 20 November 2000 prior to the release of the RROD, and the public comment period. The letter stated that the members of the Council supported the Norfolk District's preliminary decision to deny the permit for construction of the King William Reservoir. The letter stated, "This reservoir project will destroy the most important resource to the Mattaponi people, their sacred river, the "lifeblood" of their community. Fishing on this river has always been a part of their heritage and a way of living for their families."

Several letters objected to specific parts of the cultural resources section of the RROD. The comments are addressed by subject, with the various commenters identified.

(a) Archeological Issues: Comments were received from the City of Newport News, David Dutton, City Manager Ed Maroney, Nancy Howard, and Dr. Thomas King regarding eligibility of the archeological sites, VDHR's comments on eligibility, Phase II archeological study, and a rural historic landscape. Several comments were made concerning the eligibility of the archeological sites for the National Register stating that the District has misrepresented the character of the historic properties. Some background information must first be provided to address the comments. In order for a property to be actually included in the National Register, it must be formally nominated and accepted by the Keeper of the National Register. However, a property is eligible for inclusion provided it meets the National Register criteria. Both listed and eligible properties must be considered in the Section 106 review. In this process, federal agencies are not required to formally nominate properties in order to comply with Section 106. In addition, a property can be considered as eligible for the National Register for purposes of Section 106 if the SHPO (in this case VDHR) and the Corps agree on eligibility. As is correctly stated by Newport News, Phase II archeological work is a detailed testing program to determine whether sites are recommended for the National Register. Since a Phase II survey has not been completed, definitive eligibility determinations on the archeological sites are not possible. Sites that were recommended for further work (i.e. a Phase II) by VDHR in their letter of April, 1997 have the potential to be eligible for the National Register, and therefore the term "potentially eligible" is often used to describe these sites. The term "potentially eligible" is used in the Phase I report (prepared by consultants for Newport News)

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and the FEIS (page 4-77), as well as in the RROD. If fact, this term is commonly used to describe sites recommended for further work and was not used in the RROD to “inflate the importance of the sites.”

Several comments were made that the agreement by Newport News to treat the archeological sites as eligible has now been turned around to justify denying the permit. The Corps does not require agreement from permit applicants in regard to eligibility determinations for cultural resources. The potentially eligible archeological sites would have been treated the same whether or not Newport News agreed to treat them as eligible.

In regard to VDHR’s comments on the archeological sites, Mr. Dutton stated that “the RROD fails to reflect the fact that VDHR’s comments on the Phase I report only made recommendations regarding whether or not particular sites warranted further evaluation and testing.” However, on page 121 of the RROD, the VDHR’s comments are accurately reflected by stating that VDHR concurred with the majority of the report’s recommendations, and recommended “further work” on 20 sites. Also, on page 133 of the RROD, it states that VDHR recommended 79 archeological sites for further evaluation. The District does not imply that VDHR determined that these sites were eligible, and as stated above, this could not be conclusively determined without “further work.”

The City of Newport News and Mr. Dutton have suggested that the RROD be revised to reflect more accurately the actual nature of VDHR’s and other parties’ agreement and reasoning to treat the identified properties as if they were eligible for the purposes of negotiating a MOA. The District disagrees that the RROD needs to be modified. As discussed above, VDHR’s comments are accurately portrayed. Secondly, the sites were not treated as eligible properties, but as potentially eligible; and the draft MOA discussed the need for final eligibility determinations. Finally, the properties were not treated as potentially eligible simply to negotiate a MOA; they were treated as potentially eligible since they may be eligible. Mr. Dutton remarked that based on his experience, at least a third of the sites recommended for Phase II evaluation testing are ultimately determined not to meet the criteria for listing in the National Register. This may be a “rule of thumb,” but it is impossible to know exactly how many sites would be eligible in this particular case until a Phase II is completed and reviewed. Even applying Mr. Dutton’s “one third,” approximately 53 archeological sites could be found to be eligible, not including potential sites which may be located in the pipeline routes, staging areas and mitigation sites, which have not yet been surveyed.

As a final comment on eligibility of historic properties, the City of Newport News and David Dutton have stated that eligibility for or actual listing of a property in the National Register does not guarantee that the property will be protected. Mr. Dutton’s letter states that the drafters of the RROD are not conversant with this fact. Since the RROD does not state or imply that listed or eligible properties are guaranteed protection, I am unsure of the basis for this comment. The District is aware that eligibility for or listing in the National Register does not guarantee protection of a historic property. However, it does guarantee that if a federal undertaking is involved, the effect of the undertaking on the historic property must be considered. Protection of historic properties through avoidance and minimization is only one of several ways to comply with Section 106.

The City of Newport News, Mr. Dutton and Mr. Maroney commented on the discussion of the Phase II archeological survey in the RROD. The RROD states that Newport News declined to perform a Phase II (evaluation of significance) on the archeological sites. Mr. Maroney stated that the reasons for delaying the Phase II were “misconstrued” in the RROD. However, the RROD does not provide any reasons, it

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simply states the fact that the Phase II was not performed. According to comments from Newport News, Mr. Dutton and Mr. Maroney, one of the reasons for delaying the Phase II work was that any artifacts recovered during the survey would belong to the current landowners and therefore, the RRWSG would have no control over the artifacts. The District does not doubt that this was one of the factors in the decision. The RROD does not imply that Newport News did not have a good reason for not conducting the Phase II. However, since the District is not aware of correspondence documenting the reasons Newport News declined to perform the Phase II, I believe it best not to speculate on these reasons in the RROD. Regardless of the reasons, the fact remains that a Phase II archeological survey has not been completed.

The City of Newport News and Mr. Dutton have stated that MOAs are “not occasioned by anyone’s declination to do Phase II,” and disagree with the District’s statement in the RROD that a MOA was necessary since Newport News declined to perform a Phase II. The District disagrees with the comment that the decision to develop a MOA had nothing to do with Newport News’ decision not to proceed with the Phase II studies. 36 CFR Part 800.4 (b)(2) of ACHP’s current Section 106 regulations states, “Where alternatives under consideration consist of corridors or large land areas, or where access to properties is restricted, the Agency Official may use a phased process to conduct identification and evaluation efforts. The Agency Official may also defer final identification and evaluation of historic properties if it is specifically provided for in a Memorandum of Agreement (MOA).” Therefore, under these circumstances, a MOA is in fact necessary in order for the “final identification and evaluation” (i.e. Phase II) of archeological sites to be deferred. However, the District does agree with statements by Newport News and Mr. Dutton that there was collective agreement that the project would have an adverse effect on historic properties. This was also a critical reason for developing a MOA, and the RROD notes that the purpose of the MOA was to address what actions would be taken to resolve the adverse effects. The District agrees that MOAs are not unusual methods of completing Section 106, and that even with a Phase II completed, a MOA still would have been necessary. Given the project’s adverse impacts to historic properties, the District concurs that the development of a MOA was inevitable should a permit be issued for the project.

The City of Newport News stated in their comments, “It should be recognized also that the Mattaponi Tribe’s blanket objection to data recovery from archeological sites, as reported in the RROD, is by no means universal in the Native community.” Newport News also stated that representatives of other Tribes expressed a genuine interest in the educational value of the archeological resources as a means of discovering and disseminating information regarding the way of life of their ancestors. Since Native Americans are not a homogenous group, and are comprised of various Tribes and individuals, it should come as no surprise that there are different views on archeological sites. However, since the Mattaponi Tribe strongly stated their objections to data recovery numerous times, both at meetings, and in writing, I felt it appropriate to include their comments in the RROD. Although the Pamunkey Tribe did have an individual participate in the early “Phase I” archeological studies, they too have concerns about impacts to archeological sites, and stated this in their comments on the FEIS. In order to also include the Pamunkey Tribe’s point of view, the following quote from their letter of 2 May 2001 is noted: “We are justifiably concerned about the adverse effect of this project to archeological sites that surround the proposed location for the Cohoke Mill Creek Reservoir. The position of the Pamunkey Indian Tribe is that we do not want anyone to come in and destroy the Historical sites in King William, Virginia. We do not want any physical destruction, damage or alteration of all or part of this historic, sacred, cultural, spiritual land.”

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The City of Newport News and Dr. King commented on the statement on pages 133-134 of the RROD regarding the ACHP guidance entitled, “Resolving Effects Through Recovery of Significant Information From Archeological Sites.” Dr. King suggested that it is a moot point since the guidance outlines issues that may cause the ACHP to participate in consultation and ACHP has already participated in consultation for this project. The guidance states, “If this guidance is followed, it is highly unlikely that the Council would decide to enter the consultation process under 36 CFR 800.6 or raise objections to the proposed resolution of adverse effects in a given case, unless it is informed of serious problems by a consulting party or a member of the public.” Since this guidance still applies when ACHP participates in consultation, I do not believe the point is moot.

(b) Rural Historic Landscape: A few comments were made regarding the reference to a “rural historic landscape” which was included in the RROD. The City of Newport News, David Dutton and Dr. Thomas King all made statements that it was misleading to imply in the RROD that a rural historic landscape has been identified. The reference to a rural historic landscape can be found on page III-3 of the RRWSG’s Phase IA report of January 1994, and on page IV-5 of the RRWSG’s Phase I report. The statements on pages 124 and 133 of the RROD regarding a rural historic landscape are in reference to these reports, and are not intended to mislead anyone. Dr. King inquired if the District believes that the impacts to historic structures or rural historic landscapes might be of such potential magnitude that they should stand in the way of permit approval. The District has not received any new data on these issues. The draft MOA included stipulations that these resources should be identified and evaluated. The issue of a rural historic landscape has not played a determinative role in the District’s decision of denial.

(c) Suspension of the Section 106 Process: The majority of the comments received on the cultural resources section of the RROD were in regard to the issue of the suspension of the 106 process by the District in June of 1999. The following commenters expressed concern about the issue: the City of Newport News, David Dutton, Dr. King, Governor James Gilmore, Greater Peninsula Now, Inc., Donald Rice, Mr. Maroney, Councilwoman Mamye BaCote, and Vice Mayor Charles Allen. Many of the letters indicated that consultation was proceeding towards agreement when the District abruptly ended consultation. The City of Newport News expressed their displeasure with the District’s suspension of consultation in a meeting with the District in 1999 and in letters of October and November of 1999. The District has met with Newport News to discuss this issue and responded with letters in October and November of 1999. As stated in those letters and on page 129 and 132 of the RROD, because of the preliminary decision of denial, it was the District’s position that there was no longer a federal undertaking, and therefore, no further need to consult under Section 106. Although discussions with the consulting parties on the MOA and potential TCP mitigation issues were suspended, some consultation has occurred since that time including distribution of the final TCP report, further coordination with the National Park Service on documents concerning the sacred site, and a meeting and correspondence with the City of Newport News concerning Section 106 issues.

Newport News objected to the statement on page 132 the RROD that VDHR and ACHP concurred that the District was “acting properly” when the Section 106 consultation was suspended. Newport News believes the statement is inaccurate and misleading, and stated that VDHR and ACHP simply did not object to the District’s decision to end consultation. However, based upon previous conversations between staff members of these agencies, the District maintains that the statement in the RROD is accurate and is not an attempt to mislead. VDHR and ACHP both concurred that if the project was recommended for denial, there was no need for further Section 106 consultation.

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The District disagrees with statements indicating that an agreement with the Tribes had almost been reached when the consultation ended, that the Tribes were “willing” participants, and that it was likely that a resolution could be found (Governor Gilmore, Dr. Thomas King, Newport News, David Dutton, and Donald Rice). As stated in the RROD on page 129, there were substantial differences in the proposals submitted by the Tribes and the counteroffers submitted by Newport News. In addition, both the Pamunkey Tribe and the Mattaponi Tribe stated their continued opposition to the project in writing in the spring of 1999. The Mattaponi Tribe made it clear that they were only participating in the mitigation process because they felt forced into the situation due to the fear that if they did not participate, they would receive no compensation if the project were approved (RROD, p.128).

The City of Newport News and Mr. Dutton referenced page 125 of the RROD, which states, “not all parties agreed with stipulations in the MOA.” Mr. Dutton stated that one would hardly expect there to be consensus among all parties at the outset of consultation. Newport News stated that it is not uncommon for discussions regarding MOAs for complex projects to last several months. The District concurs with these statements.

Finally, Newport News has stated that the District’s decision to deny the project based on impacts to historic properties seems rather disingenuous, since the Section 106 process to determine effects and identify agreeable mitigation had not yet been completed. The Section 106 process involves several steps, and many of the steps had been completed. The undertaking was determined, consulting parties were participating, historic properties (archaeological sites and TCPs) had been identified and determined to be “potentially eligible.” The adverse effects to identified potentially eligible archeological sites were known - the sites would be completely inundated, filled or excavated by the project. The adverse effects to TCPs were considered by the District and discussed in a meeting of the consulting parties in April 1999. The issue of resolution of adverse effects was discussed at meetings with the Tribes in May of 1999. However, in this particular case, I determined that the Tribes could not be fully compensated for the losses to their spiritual connections, culture and traditional socioeconomic practices that they would experience as a result of the project. Given this conclusion, resolution of adverse effects was not possible.

(d) Traditional Cultural Properties: Several comments were received regarding TCPs and mitigation for impacts to TCPs, from the City of Newport News, Vice Mayor Allen, David Dutton, Mayor Joe Frank, Dr. Thomas King, Mr. Maroney and Greater Peninsula Now, Inc. Newport News and Mr. Dutton commented on the issue of the eligibility of the TCPs identified in the TCP report. Mr. Dutton quotes VDHR’s letter of March 31, 1999, which stated, “... the level of detail was insufficient to determine conclusively that these properties meet the criteria for listing in the National Register.” This letter is mentioned in the RROD on page 126, however, the RROD also includes the statement by VDHR that all five properties were considered “potentially eligible.” Dr. King and Mr. Dutton both concur with the District that all parties at the 1 April 1999 meeting agreed that the identified TCPs would be considered eligible for the purposes of this project. In fact, as Dr. King mentions, the eligibility of one of the TCPs, the archeological sites, had already been addressed earlier in the process, and the Pamunkey Reservation is currently listed on the National Register. Eligibility of these particular TCPs is not at issue. I do not believe that anyone would seriously question the eligibility of the Mattaponi Reservation for listing on the National Register. Newport News has stated that the District misconstrued the agreement by Newport News to treat the TCPs as eligible. However, as indicated above, an applicant’s concurrence on eligibility is not a requirement of Section 106 consultation.

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Comments by the City of Newport News and Mr. Dutton suggest that the RROD does not reflect the views of the ACHP regarding the TCP report by omitting an important comment from the ACHP letter of 31 March 1999. Newport News also stated that the District did not consult with ACHP regarding determinations of effect. The ACHP letter of 31 March 1999, requesting further detail in the final TCP report in order to determine how TCPs would be affected by the reservoir, is documented in the RROD on page 126. It should be noted that the ACHP comments were provided on 31 March 1999, prior to the 1 April meeting, and the final TCP report. The District requested that the final TCP report be revised to reflect the comments of ACHP in a letter of 26 April 1999 to the author. The final report did contain additional information on the effects on TCPs. The issue of effects to TCPs was also discussed at the 1 April 1999 meeting, which was attended by representatives of VDHR and ACHP. The consensus among the consulting parties was that the project would have adverse effects on the TCPs. The District then arranged for meetings to discuss mitigation measures. There would have been no reason to pursue mitigation measures unless it had been determined that there would be adverse effects to the TCPs.

Although Newport News stated in one part of their letter (page 9) that “eligibility and effect (of TCPs) are by no means as clear as the ROD implies,” they later stated (page 10) that “the eligibility of the TCPs identified in the report is not the issue, and never has been.” According to Newport News and Dr. King, the real issue is “the District’s subscription to the TCP consultants’ unqualified, unsolicited, unsupported, and inappropriate judgement about effects and what should be done about them.” In regard to the consultant’s qualifications, all consulting parties, including ACHP, VDHR, and the City of Newport News, agreed to the selection of investigators for the TCP study. In fact, Mr. John Sprinkle of Woodward-Clyde, a consultant for Newport News, was the first to recommend Dr. Kathleen Bragdon, and made the first contact with her. Dr. Helen Roundtree, the original TCP consultant, also recommended Dr. Bragdon as a highly qualified ethnographer. There were no objections to the selection of the consultants made by any consulting party until after the TCP study had been completed and a draft report prepared. Concerning the applicant’s claim of “unsolicited judgement about effects,” the first paragraph of the Scope of Work states, “The contractor will develop and submit to the Corps, a report describing, interpreting and explaining the views of Indian tribes and any other appropriate groups (including diverse or dissenting views, if any) regarding the likely effects, if any, of the proposed KWR-IV project on TCPs, and recommendations for the mitigation of those effects” (emphasis added). The TCP consultants’ comments on the Tribes’ views on the effects of the project on TCPs was not only appropriate, it was a requirement of their contract. In addition, as indicated on page 132 of the RROD, the District considered, but did not use, the authors’ analysis of impacts in lieu of the District’s own review. As Newport News is aware, effects of the project on TCPs was discussed with all consulting parties in April of 1999.

The City of Newport News made further comments on the District’s response in regard to statements made at the 1 April 1999 meeting with the consulting parties during the discussion of effects to TCPs. On pages 132-133 of the RROD, the District states, “Dr. King agreed that the listing of perceived adverse effects ‘generally tracks the discussion at the 1 April 1999 meeting’; however, he claims that the District’s project manager who chaired the meeting had used words such as ‘nebulous,’ ‘minimal,’ and ‘remote’ to characterize some of the listed effects. While the District does not have a verbatim record of the meeting and cannot confirm or deny that these words were used, the exact context in which they were used would be necessary for a true interpretation of their meaning.” Newport News asserts that the project manager did use those words (although they also do not have a verbatim record), and they were used in defense of the project manager’s position that all potential impacts should be included in the list, regardless of how unlikely or remote. It is expected that the various impacts would not be of equal level of importance, and some impacts would be minimal. However, if these statements were made at the

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meeting, the intent was to characterize a few of the potential impacts, and not all of them. The District believes that many of the impacts to TCPs would be considerable.

Mitigation for impacts to TCPs was mentioned in several letters submitted to the District, including letters from the City of Newport News, Governor James Gilmore, Mr. Maroney, Mayor Frank, Vice Mayor Allen, Greater Peninsula Now, Inc., David Dutton, and Dr. King. Several of the comments indicated that the mitigation package presented by Newport News to the Tribes would have enhanced the Tribes' culture and that the RROD "glosses over" Newport News' mitigation offers. In addition, several comments were made that there was no reason to believe that a resolution could not be found. The RROD does discuss in general terms the mitigation package offered by Newport News on page 129 of the RROD. The details of the packages are not discussed due to the confidentiality that was requested by all of the Tribes regarding discussions of mitigation. Details were not omitted in an attempt to make Newport News' offer seem unimportant, but in order to honor the Tribes' objective to keep the discussions confidential. However, the RROD has been revised to expand upon the elements of the "Universal Plan," which is the same for all three Tribes. In regard to comments that the mitigation package would enhance the Tribes' culture, the District maintains that the effects of the project outweigh any benefits through mitigation. Although mitigation measures and a dollar amount could be developed, I do not believe that the Tribes could be adequately compensated for their losses.

The City of Newport News and Mr. Dutton contend that the District does not understand the basic philosophy of Section 106, the purpose and intent of its implementing regulations, or the nature and goals of the Section 106 consultation process. This broad statement is made in reference to a sentence on page 134 of the RROD that "there are no standard practices for mitigation of this kind" (mitigation for TCPs). This is simply a statement of fact, which is meant to express the complexity of mitigation for TCPs. The fact that there are no standard practices for TCP mitigation is supported by Mr. Dutton's statement that there are no "one for one" or "two for one" mitigation formulas. In addition, Newport News stated on page 2 of their letter that "The District apparently fails to understand that there are no standard mitigation measures under Section 106." It is not clear how the District demonstrates a lack of understanding about the Section 106 process by this statement when Newport News and their consultant appear to concur with the statement.

Dr. Thomas King submitted further comments on the RROD's presentation of his previous comments on TCPs. Dr. King takes issue with the statement on page 132 of the RROD which notes that the City of Newport News did not originally comment on the draft TCP report, except to note that it was biased, and that comments provided by Dr. King in May of 2000 should have been made at an earlier time. The statement recommends that Dr. King's comments should have been provided at the time the Scope of Work was developed. This did not mean, of course, that Dr. King should provide comments on a report not yet developed. However, the Scope of Work was developed by all consulting parties, and if it had not been made clear what was required of the contractor, those issues should have been brought up at that time. In regard to Mr. King's contention that the contractors failed to carry out the terms of the Scope of Work, the District has reviewed the Scope of Work, and the TCP report, and believes the contractor carried out the terms specified in the Scope of Work (Memos of 24 March and 6 December 2000 by District Archaeologist, Tim Thompson).

Dr. King once again raised the issue that the authors of the TCP report were biased. Page 133 of the RROD states, "As the bias issue has been addressed in depth by the District, it was not discussed any further." Dr. King requested clarification on where and how the issue had been addressed in depth. Page

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126 of the RROD discusses how the bias issue was addressed, including responses from Dr. Kathleen Bragdon and Dr. Danielle Moretti-Langholtz, a meeting between Colonel Carroll and Drs. Bragdon and Moretti-Langholtz, and a review by the District Archaeologist. Newport News was informed in April 1999 that the allegations of bias were found to be unwarranted.

Dr. King recommended that I consider two other cases involving Section 404 permit applications, Section 106, TCPs, tribes and environmental justice issues that are currently under consideration by the Corps of Engineers St. Paul District. He recommended that I consult with fellow District Engineers to make sure that the District is considering the impacts of permitted actions on tribes and TCPs with some degree of consistency. This same issue of comparison of the King William Reservoir with projects in other Corps Districts was addressed on page 176 of the RROD. I do not believe it is necessary to consider unrelated cases, since each project has a different set of conditions and must be evaluated on its own merits. The real question is whether my handling of this permit application is in compliance with applicable laws and regulations. The ACHP, which administers the National Historic Preservation Act, has worked closely with District staff to insure compliance with Section 106.

(e) Sacred Site: Several comments were received on the issue of the “sacred site.” Newport News, David Morris, Dr. Thomas King, and George Somerville addressed this issue in their letters. Newport News is concerned that although the District insists that the sacred site did not play a part in the preliminary decision of denial, it is frequently mentioned in the RROD and in the public notice. A search for the word “sacred site” in the RROD indicates that it is mentioned only in the Historic Resources and Environmental Justice sections, and it is only mentioned once in the public notice. The RROD provides a limited discussion of the sacred site due to the protection it was granted under Section 304 of NHPA. Further discussions of the sacred site are related to letters from Newport News that attempted to deny its existence and in rebuttals from IRP, on behalf of the Mattaponi Tribe.

Governor Gilmore stated that the District appears to be applying Executive Order 13007 to the King William Reservoir in order to protect the sacred site from adverse physical impacts. The Governor stated that the intent of Executive Order 13007 is to guide Federal land-management practices on Federal land and therefore, does not apply to the lands affected by the King William Reservoir. The District concurs that since Federal land is not an issue in this project, Executive Order 13007 does not apply. The RROD does not mention this Executive Order and does not state that it is a factor in this project.

Governor Gilmore’s letter further stated that the Commonwealth is concerned that no consultation has taken place on the newly identified TCP, the “sacred site.” In addition, Newport News stated in their comments, that the sacred site “... has been the subject of no independent review or consultation at all.” This is not true. The District informally consulted with ACHP and VDHR on the sacred site after learning of the site in May 1999. The consultation was done informally, due to the Tribes request for confidentiality, and was documented in memos of 17 September 1999 and 21 September 1999. VDHR and ACHP staffs have concurred that our handling of the situation was appropriate. A reference to this consultation was not included in the RROD; therefore, Section 8 m. (10) of the Final RROD has been revised to document this consultation.

David Morris and George Somerville submitted comments regarding the public release of details on the sacred site. Mr. Morris submitted videotape of a presentation Dr. Linwood Custalow made at the April 28, 1999 Hampton City Council Meeting. According to Mr. Morris, this videotape “discloses detail and location about the alleged sacred site.” The District has reviewed this videotape, and maintains, as stated

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on page 131 of the RROD, that this very general public statement did not contain details of the sacred site as stated in IPR's 30 June 1999 letter. This presentation does not even mention the word "sacred site."

Mr. Morris has also raised the issue of the similarity between the 30 June 1999 letter and an account written by a colonial historian. The RROD stated that the Mattaponi Tribe suggests the similarities are corroboration of the oral history rather than plagiarism. However, Mr. Morris stated that Dr. Custalow's letter actually repeated many of the same words and phrases that appear in the account, including some that seem "archaic and anachronistic in a late 20th-Century context." It is the District's understanding that the letter that was read by IPR at a meeting to discuss potential TCP mitigation measures on 22 May 1999, and the letter of 30 June 1999 that the District received, contained the same information. District staff has re-read the 30 June 1999 letter, and did not find the phrase that was mentioned in Mr. Morris' letter. Furthermore, District staff did not find any terms in the letter which seem "archaic and anachronistic." As stated on page 130 of the RROD, "The District has accepted the Mattaponi Tribe's statements concerning the sacred site, and has not pursued the validity in depth due to the Tribes' request for confidentiality and the fact that no further Section 106 consultation is necessary at this time." This position is unchanged.

Mr. Morris also addressed the fact that Newport News was not allowed to see the 30 June 1999 letter until 30 May 2000. At the 22 May 1999 meeting, the Mattaponi Tribe requested Section 304 protection of the information, and the District agreed to pursue this protection. In addition, the Mattaponi Tribe objected to Newport News' request for this document. This required time to coordinate with the National Park Service to receive approval for the initial Section 304 protection, and release of the document to certain parties.

George Somerville commented on the point stated in the RROD that the authors of the TCP study learned about the sacred site from more than one individual. This is an accurate account of a discussion that occurred with Dr. Kathleen Bragdon, author of the TCP study. Mr. Somerville asserts that this is at odds with the information provided at the 22 May 1999 meeting where Dr. Linwood Custalow was stated to have "unique" knowledge of the sacred site. Newport News has stated that the validity of the sacred site is questionable since only one person is reported to have knowledge of it. In order to determine if the existence of the site (not necessarily detailed knowledge) is known to others, the District contacted Dr. Bragdon who confirmed that the sacred site was mentioned to her by several individuals during the TCP study. The 30 June 1999 letter from IPR indicates that the Mattaponi Tribal Council was always aware of the existence of the sacred site, however, Dr. Custalow had recently revealed further details about the site. Therefore, the statement at the 22 May 1999 meeting indicating that Dr. Custalow has "unique" (more specific) knowledge of the site is not a contradiction.

Mr. Somerville also commented about a statement on page 130 of the RROD that states that information on the sacred site had been released by "certain members" of the Mattaponi Tribe. Mr. Somerville stated that only one person, Dr. Linwood Custalow, is known to have publicly disclosed any detailed information about the sacred site. This sentence in the Final RROD has been revised to state "a member" rather than "certain members." Mr. Somerville also objected to the statement on page 131 of the RROD that states, "Newport News stated their belief that only the Pamunkey Tribe should be responsible for the sacred site." Mr. Somerville has stated that the City of Newport News saw no reason why the Mattaponi Tribe would have unique knowledge of the sacred site and that if any tribe were to have unique knowledge it would most likely be the Pamunkey Tribe. The statement on page 131 in the RROD was meant to summarize the District's interpretation of what Newport News was trying to convey in the

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report, not as a direct quote. The sentence on page 131 of the Final RROD has been revised to state, “Newport News does not see any reason that the Mattaponi Tribe would have unique (or superior) knowledge of the sacred site, and if any tribe were to have unique knowledge of the site, the historical evidence suggests it would most likely be the Pamunkey Tribe.”

Mr. Somerville criticized the RROD for omitting “other significant, related points in the RRWSG’s August 1999 Supplemental Report.” These issues include the following points: that Mattaponi Tribal representatives acknowledged that the Pamunkey Tribe should have the same information contained in the 30 June 1999 letter; that explanation for the Pamunkey Tribe’s silence does not account for the silence of the five other Powhatan-descended Tribes; that silence of the Upper Mattaponi Tribe is particularly significant since Dr. Custalow was Chief of the Upper Mattaponi Tribe at one time; and other still unanswered questions. In order to summarize the over ten years worth of consultation that has occurred for this project on historic properties, it was not possible to include every statement made in the numerous documents.

Newport News has stated that it is difficult to believe, after reading the RROD, that the District is not basing their decision to recommend denial of the permit in large part on the potential presence of the alleged sacred site. Governor Gilmore stated, “It is of great concern that the Corps’ decision to end consultation appears to coincide with the announcement of the presence of what is termed a “sacred site.” Dr. King also asserts that if the sacred site is the sole or major reason for denying the permit, then higher levels of proof and a higher degree of certainty are required with respect to the existence of the site and the nature and extent of any adverse impacts. As is stated in the RROD on page 130, the sacred site is not the issue that tipped the balance toward the preliminary position of denial or my denial recommendation. Since the sacred site is not the basis for denial, I do not believe that additional verification on the sacred site is required at this time.

(f) Potential Impacts and Fears: The City of Newport News commented that “the Norfolk District uses the words ‘potential’ and ‘fear’ throughout the RROD, seemingly ignoring the huge body of scientific work that has been completed, by its requirement to get past concept “potential” and to make determinations. ‘Fear’ is an emotional word that is understandable and that must be addressed.” Newport News employee, Ms. Nancy Howard, Councilwoman BaCote and Mayor Frank also express similar statements. First, a search for the word “fear” shows that it only appears once in the historic resources section of the RROD. The term is used more frequently in the environmental justice section to express the Tribes’ concerns. The word “potential” in the context of historic resources, and eligibility for the National Register, is discussed in detail earlier in this document. The word is also used to describe “area of potential effect” and the early process of identifying “potential impacts.” While some of the impacts are definitive (i.e. the loss of archeological sites), some are more difficult to determine, given the scale of this project and the extensive land area that would be impacted. The scientific studies which address cultural resources (Phase I archeological survey and TCP report) were certainly considered in this evaluation.

(g) District’s Recommendation of Denial: The City of Newport News and Governor Gilmore commented on the District’s decision to deny the project, in part due to impacts to cultural resources. Governor Gilmore stated that Section 106 does not require a federal agency to deny a permit in order to avoid all adverse effects on historic properties that may result from implementation of the project. I agree with this statement, however, this does not mean that a project cannot be denied in order to avoid

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adverse effects on historic properties. In this case, the impacts to historic properties were a factor in my determination to recommend denial of the project.

Greater Peninsula Now, Inc. stated in their letter, “You have stipulated in your February 2, 2000 letter that the “potential risk” to the tribal culture and economy would be too great and that these “losses” cannot be adequately compensated. We are aware of no documentation from the VDHR or the ACHP that would support such a position.” While the ACHP and VDHR participate and advise Federal agencies in Section 106 reviews, it is not their role to make permit decisions. In addition, the District’s decision that the impacts to cultural resources were too great, was not based solely on the Section 106 process, and impacts to historic properties (i.e. those eligible for or listed on the National Register). The District’s decision was based on the overall impacts to a broader category of “cultural resources,” and included the requirement to consider cultural resources under NEPA and environmental justice. In addition, the impacts to cultural resources were considered cumulatively with the environmental impacts.

n. Air Quality: Residences along State Route 626 and recreational uses in Cohoke Millpond could be adversely impacted by hydrocarbon emissions from the internal combustion engines of construction vehicles and increased dust emissions from land disturbances and construction activities at the reservoir. There are no residences in the immediate vicinity of the proposed intake. However, subsistence fishing and gathering by the Mattaponi Tribe as well as recreational uses of the Mattaponi River by the general public could be adversely impacted by construction activities. Increased dust emissions could also have an adverse effect on fish and wildlife resources in both construction areas.

Had the project been authorized, it would have been analyzed for conformity applicability pursuant to regulations implementing Section 176(c) of the Clean Air Act. It is anticipated that the activities proposed under this permit application would not exceed de minimis levels of direct emissions of a criteria pollutant or its precursors and are exempted by 40 CFR Part 93.153. Any later indirect emissions would generally not be within the Corps’ continuing program responsibility and generally could not be practicably controlled by the Corps. For these reasons a conformity determination would likely not be required.

o. Health and Safety: The increased vehicular traffic on rural roads in the area from the transportation of workers and materials to the construction sites during the anticipated three-year construction period could lead to increased traffic incidents. The existing Cohoke Creek crossing of County Route 626 would be inundated by the reservoir pool, but would be relocated to the top of the dam structure. Emergency access for police and fire vehicles would be temporarily re-routed during construction. Short-term increases in noise levels are expected during construction and long-term increases in ambient noise levels would occur during the operation of pumps at the pump stations on the Mattaponi River and at the reservoir.

The Corps of Engineers Institute for Water Resources’ analysis of the need for additional water indicates that unless the region suffers a drought more severe than any recorded in the twentieth century, the RRWSG would have minimal risk of shortage through about 2020. The risk of shortage requires implementation of drought curtailment measures (water use reductions) and does not translate into a risk to human health and safety.

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p. Recreation:

(1) Mattaponi River: The Mattaponi River and its banks are used year-round for recreational fishing, boating and hunting. Although there are several public boat ramps on the river, none are located in the immediate vicinity of Scotland Landing. The Mattaponi River and its freshwater tidal wetlands support a number of fish and birds important to local sportsmen and there are several privately owned duck blinds and hunt clubs near Scotland Landing. King William County plans to develop a recreational park on the remainder of the 188-acre parcel purchased by the City of Newport News for the construction of the intake and pump station. The Mattaponi Tribe has expressed concern that additional recreational boating would disrupt their subsistence fishing and other traditional uses of the river. Mattaponi Tribal fishermen report that pleasure boaters often negatively impacts their catch by ripping their drift nets. During discussions on potential mitigation for the adverse effects to Traditional Cultural Properties, the City of Newport News offered to ensure that the County would not include a boat ramp at the proposed recreation area. River water depths would not be measurably impact by the proposed withdrawals since the intake would be located in tidal waters. The intake structures should not restrict recreational uses of the river, however the intake area would be marked by warning buoys.

(2) King William Reservoir: King William County plans to develop up to 5 recreational sites on and adjacent to the reservoir for swimming, fishing and boating. In order to protect water quality, only electric outboard motors would be allowed. The plan includes the construction of fishing piers, boat launching facilities and floating boat docks to provide public access for year-round recreational fishing. The VDGIF recommended that King William County consult with them regarding the location of boat ramps within the reservoir. Also, camp sites, picnic areas and nature trails would be established. The reservoir would provide a 1,526-acre lake which would be stocked with forage and game species for freshwater fishing. Hunting would also be allowed in the vicinity of the reservoir with certain restrictions.

In the 1990 King William Reservoir Project Development Agreement, the City of Newport News promised King William County that for at least 90% of the time, water surface elevations within the reservoir would remain within 6 feet of the spillway elevation to ensure continued recreational benefits. However, because the District required that the proposed 47% dead storage included for recreational purposes be reduced, the applicant revised the Agreement to reflect 25% dead storage. This storage would provide water surface elevations within 15 feet of the spillway elevation for at least 90% of the time and within 2 feet of the spillway for at least 60% of the time. Then in a second addendum to the Agreement, the City of Newport News pledged to further protect the recreational benefits of the smaller surface area with KWR-IV by guaranteeing that the water surface elevation would remain within 15 feet of the spillway elevation at least 94% of the time and within 2 feet of the spillway elevation at least 69% of the time. It is not clear how this can be guaranteed under the modified 80% Exceedence MIF which is a condition of the DEQ permit. There would undoubtedly be times when even the less restrictive modified 40/20 Tennant MIF proposed by the applicant would not allow withdrawal from the Mattaponi River to maintain these levels.

(3) Cohoke Creek: Several bird and mammal species are hunted in the Cohoke Creek valley and there are a number of hunt clubs and duck blinds that could be impacted within the basin. The land available for hunting in the area would be significantly reduced. The majority of recreational fishing in Cohoke Creek takes place downstream of the proposed reservoir in the privately owned 85-acre Cohoke Millpond where the Cohoke Club has a small boathouse and a private fishing dock. Fish species in the

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Millpond could be impacted by siltation during reservoir construction and by long-term changes in water quality and quantity as a result of reduced flows.

(4) Diascund Reservoir: In their May 1999 Fish and Wildlife Mitigation Plan, the RRWSG mentioned for the first time the proposed development of a public recreational facility at Diascund Reservoir as a recreational benefit of the King William Reservoir project. They stated “New Kent County, through which part of the pipeline will run, will benefit from the development of a new public recreational facility at the existing Diascund Creek Reservoir.” This has not been proposed to the District; therefore, the impacts have not been evaluated. Depending on the nature of the facility, a permit from the Corps of Engineers may be required.

q. Socioeconomics:

(1) Mattaponi and Pamunkey Indian Tribes: The Mattaponi and Pamunkey People have lived by hunting, trapping, fishing and gathering on the Mattaponi and Pamunkey Rivers and in the area known as Pamunkey Neck for thousands of years and still depend to a great extent on the natural ecosystem that surrounds their reservations. Many current residents of the reservations make their living from the Mattaponi and Pamunkey Rivers and the surrounding land and rely on the year-round gathering of fish and other animals and plants for their subsistence. Both tribes operate shad hatcheries to restore the shad stock in the York River basin. Tribal members consider shad fishing an important traditional community-centered activity and an integral part of their identity.

A substantial portion of the Mattaponi Tribe’s food supply comes from fishing, mostly during the shad and herring runs in the spring. Tribal members also depend on other fish such as striped bass, catfish, perch and carp as well as game such as deer, wild turkey, ducks, geese, squirrels, rabbits, turtles and beaver. The use of wild plants is an important part of the lives of many tribal members. Approximately sixty wild plants found on the reservation or the surrounding land are still gathered by the Mattaponi People for food, medicine, and ceremonial and ritual uses. Plants used for medicinal purposes include myrtle leaves, flag root and foxglove. Plants gathered for food include tuckahoe tubers, local wild cactus, wild rice and yucca. The Mattaponi Tribe believes that the Mattaponi River and the ecosystem surrounding the reservation are critical to their continued existence as a tribe.

The Mattaponi Tribe fears that the potential increased salinity levels from the proposed pumping of up to 75 mgd of freshwater from the Mattaponi River could result in significant adverse impacts to American shad and related fish species and irreversibly alter the natural habitat of freshwater plants and animals on which the Tribe depends. Also, they fear that the withdrawal would increase water temperatures and reduce oxygen levels in the summer resulting in adverse effects to shad and herring nursery areas. As the intake would be located within the prime spawning area for shad and other anadromous fish, the Tribe fears that the intake would harm fish eggs and juveniles, remove the fishes’ food supply and concentrate predatory fish. They fear that changes to hydrologic patterns and tidal dynamics would adversely affect shad habitat, disrupt spawning behavior and affect the viability of eggs and the survivability of larvae and juveniles; all of which could eventually destroy the already depleted shad supply. Disruption of their shad fishery and hatchery operation would represent a major cultural loss and a potential economic loss to the Mattaponi Tribe.

The Mattaponi Tribe also fears that the construction of such a massive project so close to their reservation as well as increased property development brought to this rural area by the reservoir would disrupt their

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hunting and gathering practices and irrevocably alter their way of life, their culture and ultimately, their existence as a tribe. According to the 1997 King William County Comprehensive Plan, moderate residential development would be allowed within the watershed protection area around the reservoir; and moderate mixed residential, light commercial and planned unit development would be allowed along the periphery of the watershed protection area. Such development would change the rural and agricultural setting of the area and decrease the habitat available for hunting and gathering. The Mattaponi Tribe views the reservoir and the subsequent development around the reservoir as further trespass on their historic lands. According to the Mattaponi Tribe, many of their people who live off the reservation would like to return to their traditional homeland to continue the Tribe's culture and traditional way of life. As a part of their "Legacy Plan," the Mattaponi Tribe is trying to acquire additional land for expansion of the reservation to allow more tribal members an opportunity to move to the reservation. Residential and commercial development such as that described in the King William Comprehensive Plan may compete with the Tribe for those lands and may drive real estate prices in the area out of the reach of Tribal resources. The development potential of the land surrounding the reservoir would be expected to increase its value, especially the lakefront property. The Mattaponi Tribe fears that these impacts would eventually mean the demise of the Mattaponi Tribe.

(2) Commercial Fisheries: The taking of shad in the Mattaponi River is prohibited to the general public due to depleted stocks. Creel limits for shad are zero in other rivers as well, including the upper portions of the Pamunkey River, Rappahannock River, James River, Meherrin River, Chickahominy River and the Appomattox River. However, shad are commercially fished in the Chesapeake Bay, and any adverse effects to spawning in the rivers would affect the economy of those depending on the commercial catch of shad in the Bay.

(3) Development Potential: The population of King William County increased only slightly in recent years and the County remains primarily rural. The RRWSG stated in the FEIS that there would be minimal development around the reservoir. However, King William County intends to allow moderate residential development within the watershed protection area around the reservoir; and moderate mixed residential, light commercial and planned unit development along the periphery of the watershed protection area. The recreational potential offered by the open water of a man-made lake would undoubtedly lead to an increase in the development of retirement, weekend and summer homes. Since the County's recent population growth is related to the growth of the City of Richmond, there is the likely potential for the development of bedroom communities in the area as well. Central water and sewage services are not available and the County does not currently plan to develop a central water system to take advantage of the 3 mgd source of raw water available to them as hosts for the reservoir. The County has stated that it is more likely that the water resource would be used to attract industry to the county rather than to replace residential wells; therefore, any new residential development would be dependent on wells. The value of the land surrounding the reservoir may increase following the construction of the reservoir, especially the immediately adjacent waterfront lots. The RRWSG will acquire the land on which the reservoir would be built and transfer it to King William County. No existing houses would be displaced by construction of the reservoir; however, if landowners do not wish to sell, the RRWSG may acquire the land through eminent domain. As King William County will own the land, the County would benefit financially from lease and tax payment from the City of Newport News. Also, the County would receive financial gain from the added recreational opportunities provided by the lake. Business activity in the area is expected to temporarily increase during construction.

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(4) Agricultural Irrigation: There are minor withdrawals of freshwater from the Mattaponi River for agricultural irrigation. Farmers who use Mattaponi River water fear that the impact of the proposed withdrawals in addition to natural salinity changes would increase the frequency of salinity intrusion and destroy their crops if they continue to use the water for irrigation. In the FEIS, the RRWSG investigated the most downstream irrigator, Enfield Farm in King William County. The farm is situated on the oligohaline range of the river where the average salinity is 0.0 to 0.5 ppt and current crops are corn, soybeans and turf grass. The RRWSG reported that the threshold level at which some crops (e.g. corn) begin to experience negative impacts from increased salinity is 0.45 to 0.5 ppt. The RRWSG's analysis of salinity data shows that the post-withdrawal salinity level would still be below the tolerance threshold levels. Also, the RRWSG's analysis indicated that the crops grown by these farmers would be tolerant of the small predicted salinity increases brought about by the withdrawal and concluded that there would be no adverse impacts on irrigation as a result of withdrawals. The RRWSG's analysis is based on the results of the VIMS salinity study which did not consider the cumulative effects of other consumptive uses or the additive effect of the proposed withdrawals with natural, pre-existing salinity fluctuations. The RRWSG's analysis also did not appear to consider the effects on less salinity tolerant crops or future increases in agricultural irrigation in the Mattaponi watershed.

(5) Increased Cost to Newport News Waterworks Customers: Newport News Waterworks customers have expressed concern that the costs associated with building the reservoir will cause their water rates to increase. The City of Newport News has acknowledged that water rates will increase by 31% by the year 2006 (64 cents per 100 cubic feet of water- \$85.56 more per 100,000 gallons than current charges) in order to pay for the King William Reservoir and other water supply projects. Half of the rate increase (\$150 million dollars or \$43.00 per 100,000 gallons) is attributed to the King William Reservoir. To date, an estimated \$16 million has been spent on the planning of the reservoir. Several months after my preliminary position of denial was announced, the Newport News City Council approved spending an additional \$680,000 for legal and engineering fees associated with continued pursuit of the permit. The most recently reported estimate for the total cost of the King William Reservoir was \$167.5 million dollars.

Comments were received in response to the RROD from many Peninsula residents concerning their displeasure for the amount of taxpayer's money that was being spent on what they feel is an unnecessary project. The Sierra Club suggested that construction of the reservoir would result in higher water rates for all Newport News Waterworks customers and disproportionately burden the customers with limited incomes in the Cities of Newport News and Hampton. They stated their belief that this in turn would result in the economically disadvantaged populations subsidizing an expanded water supply infrastructure for the more affluent residents and businesses relocating to James City and York County.

(6) Potential for Loss of Employment, Development and Expansion Opportunities on the Peninsula: In his comments on the RROD, Governor Gilmore contends that all of the citizens of the Commonwealth, including the tribes, stand to benefit from the reservoir either directly in terms of water supply, or indirectly in terms of associated economic growth. Governor Gilmore stated that it is the policy of Virginia Governors to promote economic development in all parts of the Commonwealth and that any constraint on future availability of potable water in the Lower Peninsula could cast doubt over economic development decisions. Also, DEQ Director, Dennis Treacy commented that frequent and lengthy periods of forced water conservation would adversely affect the Peninsula's economy, making it difficult to recruit industry and provide employment for the region's growing population.

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I am convinced that the City of Newport News has overestimated their water deficit, however, I have not ignored the impact that my decision could have on citizens of the peninsula. On page 199 of the RROD, I stated that “While the cost to the environment of providing more water than the RRWSG needs at this time are too high, it is reasonable and appropriate for me to consider what would happen if the risk of shortage is as great as reported by the RRWSG. I acknowledge that the costs to the RRWSG of providing too little water are also high. As stated in 33 CFR 320.4 (m), ‘Water is an essential resource, basic to human survival, economic growth and the natural environment.’ However, this section goes on to state, ‘Water conservation requires the efficient use of water resources in all actions which involve the significant use of water or that significantly affect the availability of water for alternative uses including opportunities to reduce demand and improve efficiency in order to minimize new supply requirements.’ If deficits were to develop more quickly than I anticipate, one or more of the incremental alternatives discussed in Sections 7 and 10 (groundwater, desalination, use of dead storage between 33% and 25%, drought curtailment, etc.) could be called upon to solve this problem more quickly and less expensively than the proposed King William Reservoir. Indeed, I find this to be both the environmentally preferred alternative (under NEPA) and the least environmentally damaging, practicable alternative (under the 404(b)(1) Guidelines), because of its inherent flexibility and its low environmental costs.”

The District balanced the reasonably foreseeable benefits of the project against the reasonably foreseeable detriments and concluded that the project, as proposed, is contrary to the public interest. Further, the direct benefits of water supply can be gained using one of several alternative means of obtaining this water, without the degree of environmental harm. The indirect benefits of economic growth would vary depending on the alternative source which is implemented.

The Sierra Club, Mark Fowler and Dr. Wesley Pullman disagreed with the City of Newport News’ assertion that failure to construct the King William reservoir would have a disproportionate negative impact on the economically disadvantaged of Newport News, would inhibit growth in Newport News and cause the loss of minority jobs. Dr. Pullman stated that the City of Newport News has been growing rapidly for many years and will continue to grow in the future. He stated his belief that building desalination plants would result in higher quality urban planning and the provision of more jobs for local minority workers than would the construction of the King William Reservoir.

r. Energy Needs: Fossil fuels would be consumed during the construction of the reservoir, and electric power would be used to run two pump stations. No adverse impacts are anticipated.

s. Land Use Classification and Coastal Zone Management Plans: The project must be constructed and operated in a manner that is consistent with the Virginia Coastal Resource Management Program. The City of Newport News has written to the Virginia Coastal Program Manager stating that the project is consistent with the Act; however, the state has requested more information in order to determine if they concur with the applicant’s draft federal consistency certification.

(1) Mattaponi River: According to the 1997 Comprehensive Plan for King William County, the intake site would be located within a designated Resource Protection Area; therefore, its development must comply with the Chesapeake Bay Preservation Act. Due to the remoteness of the Mattaponi River intake site from existing development, limited impacts on existing land uses are anticipated. However, a “no discharge zone” would be required for five miles both upstream and downstream of the intake pipeline at Scotland Landing which could result in restrictions to property owners for future development on both sides of the river. An access road and 2.5 miles of new electrical transmission line to the pump

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station would require additional clearing and right-of-way maintenance. King William County has announced plans to develop the remainder of the 188-acre property purchased for the 3-acre intake site as a recreational park.

(2) King William Reservoir: The King William Reservoir would be constructed in King William County, a rural area with little or no commercial or industrial development. The project area is generally undisturbed except for silvicultural activity. The majority of the reservoir watershed is currently forested land and the remainder consists of wetlands, open water and roads. About 65% of the watershed is currently managed for silvicultural activities. No existing houses would be displaced by the proposed reservoir. According to the 1997 King William County Comprehensive Plan, the area immediately adjacent to the reservoir would be designated as a Resource Protection Area in accordance with the Chesapeake Bay Preservation Act. This would be a 100-foot wide buffer zone around the reservoir in which no buildings, land disturbance activities or clearing would be allowed. The remainder of the watershed is designated as a Watershed Protection Area which is also in the County's Resource Management Area. The RRWSG stated in the FEIS that there would be minimal planned development around the reservoir; however, the 1997 King William County Comprehensive Plan indicates "Moderate residential development is intended within the Watershed Protection Area and at its periphery a narrow area is designated for moderate mixed development of residential, light commercial and planned unit development." Human disturbances from such development would change the rural and agricultural setting of the area.

(3) Pipeline Routes: The pipeline would traverse forested and agricultural lands. Agricultural lands would be removed from their current use and forested areas would be cleared. The forested areas would not be allowed to re-grow as forests but only as herbaceous or scrub-shrub cover types so that the utility corridor could be maintained.

t. Environmental Justice:

(1) Executive Order 12898: Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (59 Fed. Reg. 7629), requires federal agencies to consider disproportionately high and adverse environmental effects on minority and low-income populations and to give minority and low-income populations access to information and opportunities to provide input to decision-making on federal actions. Therefore, the District and EPA consulted concerning federal actions to achieve environmental justice when considering impacts to the American Indian and African-American minority populations in the area. As a part of their mission, federal agencies must identify and address any disproportionately high and adverse human health or environmental effects of their activities, programs, or policies on minority and low-income populations.

Although an environmental justice analysis is not mandated by NEPA, the Department of Defense has directed that NEPA be used as the primary approach to implement the provisions of Executive Order 12898. In a memorandum accompanying the February 11, 1994 Executive Order, President Clinton specified that federal agencies shall analyze the environmental effects, including human health, economic and social effects, of federal actions, including effects on minority communities and low-income communities, as well as mitigation of those effects, when such analysis is required by NEPA. The memo further directs federal agencies to improve the accessibility of meetings, crucial documents, and notices, and to use Title VI of the Civil Rights Act of 1964 to ensure that all programs or activities that receive federal financial assistance that affect human health or the environment do not unjustly discriminate.

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The applicant and the District previously attempted to undertake an environmental justice analysis for the King William Reservoir project in the Supplement to the Draft EIS (December 1995) and Final EIS (January 1997). Those efforts came at a time when environmental justice analysis was a relatively new concept to federal agencies, including the District and EPA. At that time there was little guidance available to agencies as to how to properly analyze environmental justice issues. Although the available information has not changed substantially, our current understanding of the process has. Therefore, the District determined that the environmental justice analysis for this project should be updated and refined to more fully and accurately reflect current expectations for such analyses in the federal review process. The District is including an updated analysis in this document.

(2) Minority Populations Potentially Affected by the Proposed Project:

African Americans: A small African-American community is located near State Route 626 in the vicinity of the proposed dam. The applicant's plans for the reservoir would not result in the displacement of any of the homes in this community. The District held a public meeting at Aquinton Elementary School, in King William, Virginia, in 1994. No one attending this meeting identified themselves as members of this community or spoke out against the project. The City of Newport News also held a meeting in October 1997 with property owners and residents of this area. The District did not receive any public comments identifying such comments as coming from this minority group either in support of or in opposition to the project. Construction of the reservoir would result in increased vehicle traffic, increased noise and increased dust emissions from land disturbance that would affect the minority community. However, as these impacts would also be felt by non-minority individuals in the area, these effects would not be considered as disproportionately high and adverse impacts to this minority population.

Native Americans: Three Native American tribes would potentially be affected by the proposed King William Reservoir: The Mattaponi, Pamunkey and Upper Mattaponi Tribes. The members of these Tribes are descendents of the Powhatan people who occupied the land when the first European settlers arrived in the 17th Century. The Tribes were notified through public notices and other letters about the King William Reservoir proposal almost from the beginning of the project (approximately 1994) when it was one of 31 alternatives considered in the Draft EIS. The Norfolk District Corps of Engineers has been working closely with the Pamunkey, the Upper Mattaponi and the Mattaponi Indian Tribes since approximately February 1997 to identify the reservoir permitting issues that have the potential to affect the Tribes.

The proposed reservoir would not be built on Tribal lands, but would be located between Virginia's only two American Indian Reservations: the 150-acre Mattaponi Reservation on the Mattaponi River with 65 residents and the 1,200-acre Pamunkey Reservation on the Pamunkey River with 75 residents. The Upper Mattaponi Tribe owns community land, but does not have a reservation. The Mattaponi and Pamunkey Reservations are two of the oldest Indian reservations in the United States. Also, the water needed to fill the reservoir would be withdrawn from the Mattaponi River, at a location upstream of the Mattaponi Reservation.

The Tribes believe that the proposed reservoir and Mattaponi River water withdrawal would affect them environmentally, culturally and economically. The Tribes claim that the reservoir would destroy their way of life through the loss of hunting, gathering and fishing habitat, by changing the rural setting through increased residential growth around their reservations, and by severing ties to their ancestors within the Cohoke Valley when archaeological sites are excavated and/or flooded. The Mattaponi people

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also believe that their subsistence shad fishery and hatchery operation would be lost or irreparably harmed by changes in salinity and impacts to shad eggs and juveniles associated with the raw water intake on the Mattaponi River. The Mattaponi Tribe claims that the land and River are their heritage and are critical to their culture and their continued existence as a tribe. The Mattaponi Tribe describes their heritage as a spiritual and historic connection to the Mattaponi River and the Cohoke Valley.

(3) Federal Trust Responsibility: None of the three Tribes is yet federally recognized, and until recently all were seeking that status. In January 2001, the Mattaponi and Pamunkey Tribes withdrew from the effort of all eight Virginia tribes to obtain federal recognition. Although the federal trust responsibility to Native American tribes applies only to federally recognized tribes, the Norfolk District has chosen to treat the Tribes as though they were federally recognized to the extent possible and appropriate. On 25 February 1998, former District Commander, Colonel Robert H. Reardon, Jr. signed a Memorandum for the Record memorializing his 7 March 1997 decision to treat the Mattaponi and Pamunkey Tribes “as if they were federally recognized tribes, to the extent I am permitted to do so by applicable statutes and regulations.” Accordingly, the Norfolk District has made every effort to keep the Tribes informed during the processing of this permit application and to involve them where their input was appropriate. The Treaty of 1677, which was made with King Charles II of England, is held by the Commonwealth of Virginia, not by the federal government; therefore, any Corps permit decision could not violate the treaty.

(4) Demographic Characteristics of the Closest Census Tract: Typically, an environmental justice analysis requires that the federal agency collect population data, using census data to describe the race and income characteristics of the residents within the census subdivisions in and around the area of the proposed action. To determine proportionality of effects, each census tract or block numbering area (BNA) is usually compared to the statistics of a large community as a whole. This larger community is called the “community of comparison” (COC). It is identified as the smallest political unit(s) that encompasses the entire impact footprint, and could be a county, a municipality, a collection of such entities, or even the entire state in appropriate circumstances. Comparing the statistics of each tract or BNA with those of the COC will indicate which tracts have a higher proportion of minority or low-income populations. The tracts with the higher proportion of these populations and that are touched by the adverse impact footprint are presumed to suffer disproportionate impacts, even if the COC exhibits a higher minority or low-income population percentage than the affected tract. If the census tract percent is equal to or less than the COC percent, a federal agency can generally presume no disproportionate effect on minority or low-income populations.

King William County, being a rural area, is comprised of BNA’s 9501, 9502 and 9503, together identified as Geocode 51101. Block Numbering Area data for King William County reveals the following: The total minority population of King William County as determined by the 1990 census was 3,542, representing 32.4% of the population. Most of this minority population was African-American. Sixteen Hispanic residents accounted for 0.1% of this demographic. The Native American/Eskimo/Aleut population of King William County was 218 individuals, or 2.0% of the county’s total population. Persons below the poverty level numbered 1,002 or 9.3% of the total county population. The census data available to the Norfolk District does not correlate these two statistics, so it is not possible to determine how many of the minority households might also fall into the “below the poverty level” category. (Not all 2000 census data were available at the time of this analysis; therefore the complete 1990 census data were used.)

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In certain situations it is appropriate for an environmental justice analysis to consider effects in a somewhat different manner than by comparing BNAs or census tracts to COCs as described above. This is because concentrations of isolated minority or low-income populations within the impact footprint could be missed despite their being unfairly impacted by the project in a way the larger population is not. This was the case in King William County, where the total environmental justice population (i.e., the three Native American Tribes) was a mere 2% of the entire county population. EPA's Final Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analysis notes that:

“A factor that should be considered in assessing the presence of a minority community is that a minority group comprising a relatively small percentage of the total population surrounding the project may experience a disproportionately high and adverse effect. This can result due to the group's use of, or dependence on, potentially affected natural resources . . . The data may show that a distinct minority population may be below the thresholds defined in the IWG key terms guidance on minority population. However, as a result of particular cultural practices, that population may experience disproportionately high and adverse effects. For example, the construction of a new treatment plant that will discharge to a river or stream used by subsistence anglers may affect that portion of the total population. Also, potential effects to on- or off-reservation tribal resources (e.g., treaty-protected resources, cultural resources and/or sacred sites) may disproportionately affect the local Native American community and implicate the federal trust responsibility to tribes.”

Such is the case with the effects that would occur from the construction of the proposed King William Reservoir. It is important to note that this environmental justice analysis deals with something other than the more typical discussion of whether a low-income or minority population would be disproportionately and adversely impacted by effects such as pollution or noise. Many of the impacts to the minority populations discussed herein result from impacts to their cultural resources, as well as to natural resources they use in a manner that differs from the general population of the area.

(5) Potential Adverse Environmental Effects to the Tribes: The City of Newport News claims that a substantially larger number of minority (African Americans) and low-income individuals on the lower peninsula would benefit from the affordable and reliable future water supply and the growth it would spawn than the number of minorities (American Indians) that would be harmed by the project. Therefore, they reason that there would not be a disproportionately high adverse effect to a minority population. Instead, they claim that the economy and cultural values of the much larger minority and low-income community on the Peninsula would be affected if water from the proposed King William Reservoir is not made available to them. This interpretation is clearly not the intent of the President's Environmental Justice directive. When determining whether environmental effects are disproportionately high and adverse, federal agencies are to consider the following:

- whether there is or would be an impact on the natural or physical environment that significantly (as defined by NEPA) and adversely affects a minority population, low-income population, or Indian tribe. Such effects may include ecological, cultural, human health, economic, or social impacts on minority communities, low-income communities, or Indian tribes when those impacts are interrelated to impacts on the natural or physical environment; and

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- whether environmental effects are significant (as defined by NEPA) and are or may be having an adverse impact on minority populations, low-income populations, or Indian tribes that appreciably exceeds or is likely to appreciably exceed those on the general population or other appropriate comparison group; and
- whether the environmental effects occur or would occur in a minority population, low-income population, or Indian tribe affected by cumulative or multiple adverse exposures from environmental hazards.

The District has identified the following potential adverse environmental effects to the Tribes associated with this project. These impacts include, but are not necessarily limited to the following and are not listed in order of importance.

(a) Impacts to Cultural Resources: The Mattaponi Tribe considers any effort to locate, excavate, construct or flood archaeological/historical sites as disturbing to them and their deceased ancestors. Proper reverence and concern for the Tribe's culture is of critical importance to them. Flooding of the area, even if the sites have been excavated, would represent an unacceptable cultural and religious loss to the tribes. Although the initial archaeological survey did not locate any burials, all three Tribes are very concerned about the possibility that human remains would be discovered within the impact footprint during the more extensive Phase II archaeological survey. Although the Pamunkey Tribe is willing to have skeletal remains relocated, any disturbance or removal is unacceptable to the Mattaponi Tribe, who requested that the remains be left undisturbed by reconfiguring the project design. Also, the Mattaponi Tribe has asserted that a specific sacred site of great historical significance exists somewhere within the area to be impacted by the proposed reservoir. Because of the great traditional and religious significance of this site, and their cultural reticence to discuss issues of this nature with outsiders, the Tribe chose not to mention this site or bring it to the District's attention until May 1999. Disrupting or flooding the sacred site, any potential burial sites, and the approximately 115 archaeological sites within the impact footprint would be perceived as a significant spiritual loss to the Mattaponi Tribe. These impacts are unacceptable to the Mattaponi Tribe and such spiritual and cultural losses cannot be compensated. While data recovery would be the presumed course of action when a project area would be flooded, recent guidance from ACHP indicates that data recovery may not be appropriate when: (1) the site is likely to contain human remains, funerary remains, sacred objects or items of cultural patrimony, (2) the site has long-term preservation value, such as traditional cultural and religious importance, and (3) there are unresolved issues with any Indian tribe concerning the recovery of significant religious and cultural properties.

(b) Loss of Archaeology: The Tribes are concerned that any excavation of archaeological sites has the potential for loss and/or mishandling of the resources they contain. The loss or mishandling of artifacts that could help demonstrate that the tribes are culturally identifiable entities with continued occupation of the area could adversely affect the Tribes' ability to successfully achieve federal recognition. Additionally, non-Indians would most likely be given the responsibility for interpreting any archaeological resource. The Tribes feel that they would suffer a loss if their own people are not primarily involved in this interpretation. The City of Newport News has offered to have a tribal member present during excavation; however, the tribes remained concerned about possible misinterpretation of their culture and heritage. Only the 72 to 79 sites considered to be "potentially eligible" are included in treatment plans in the MOA; therefore, treatment of the remaining identified sites would be outside of the Section 106 review process. Although the Mayor of the City of Newport News made a commitment to

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the tribes to investigate the remaining sites within the reservoir footprint, the level of review that these sites would receive is unknown and would not be binding under the proposed MOA.

(c) Effects of Water Withdrawal from the Mattaponi River: The Tribes believe that there would be adverse impacts from the reservoir intake on shad eggs and shad juveniles from entrainment and impingement. Any eggs, juveniles, and fish food sources smaller than one millimeter could be pulled into the intake and lost. The Tribes are also concerned about the potential effects of increased salinity of the Mattaponi River on the spawning behavior of adult shad and other anadromous and non-anadromous fish and on the growth and mortality of shad eggs and juveniles. The Tribes believe that the withdrawal of water and its associated salinity changes could affect when and where fish spawn and affect the availability of food sources. There may also be adverse effects on the Mattaponi's subsistence shad hatchery (and possibly the Pamunkey shad hatchery as well). The Tribes believe that higher salinity levels and other physical and chemical changes associated with the water withdrawal could affect the survival and development of shad fry released into the river by the Tribes at their hatcheries. The released fry would also be subject to entrainment and impingement at the intake.

Despite the limited biological and ecological information available, the City of Newport News has concluded that there would be no adverse impact to any life stages of shad in the York River basin. This conclusion has not been substantiated. Dr. Garman did not concur with the Tribe's claim of significant and detrimental impacts as a direct result of the King William Reservoir project; however, he noted that his review did not consider the potential for indirect ecological effects as a result of physiochemical changes on fish assemblages. He stated that without information on temporal and spatial distribution, spawning and early life history stages, it is very difficult to assess the ecological impact on anadromous fish populations in the Mattaponi River from the proposed project. While the intake design should reduce impacts to anadromous fish eggs and larvae, it would not eliminate them altogether. It is true that despite the best efforts of the state and the Tribes, the shad population may continue to decrease even without the water withdrawal for the reservoir. However, the interaction of numerous chemical and physical effects including the small but sustained increase in salinity that would result from the removal of up to 75 mgd of freshwater from the Mattaponi River has the potential to further degrade the already depleted shad population. The Mattaponi and Pamunkey Tribes have made a considerable commitment to their shad hatcheries, and shad fishing is an integral part of their lives and their culture. As members of the Mattaponi Tribe depend on these fish for their livelihood, the further degradation or potential loss of this resource would significantly and adversely affect the culture and economy of these people.

(d) Mattaponi River Cultural Factors: The Mattaponi Tribe considers the Mattaponi River the lifeblood of the Tribe and a gift of life from the Great Spirit. To them it is a very spiritual place and much more than simply a body of water. The Tribe has many religious and spiritual ceremonies closely associated with the river, which they consider "sacred waters." The Tribe believes that disruption or "defiling" of the river and its flow would create an imbalance in the circle of life and dishonor the Tribe's ancestors and Mother Earth. The spiritual importance of the Mattaponi River to the Tribe was recognized in its identification as a Traditional Cultural Property. This spiritual and religious importance is a vital cultural value which may be difficult for non-native people to understand. Because this cultural value is unique to the Native Americans in the project area, impacts to it would appreciably exceed those to the general population.

(e) Impacts of Increased Recreational Boating on the River: Boating activity disrupts the Tribes' ability to successfully fish both on a daily basis and during the shad runs in the spring. Fishing

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nets are also damaged by boat propellers. These effects already occur to some extent, but the Tribes fear a substantial increase if the King William Reservoir is built because of the increased residential development that is likely to follow. Recreational boating may also disrupt tribal spiritual and religious ceremonies performed on the river, including baptisms. Increased boating activity is likely to occur with or without the proposed reservoir; however, the planned residential development in the area will most likely lead to an increase in recreational uses of the River. Because fishing for subsistence is vital to the Tribes (and possibly to other low-income populations in the area), further disruption of their ability to obtain fish would appreciably exceed such impacts to the general population.

(f) Socioeconomic Effect on Hunting, Trapping and Gathering: Many members of the Mattaponi Tribe do not have outside jobs, and they depend upon the natural resources in the Pamunkey Neck for subsistence hunting, fishing, trapping and gathering. The Mattaponi Tribe would lose a portion of their subsistence hunting and trapping area if the 1,526 acres of wetlands and uplands in the Cohoke Valley are filled, flooded or otherwise modified by the construction of the proposed reservoir. The County's planned residential and light commercial development around the reservoir would further decrease the land available for hunting, trapping and gathering. **Development of these private lands is a possibility even without the construction of the proposed reservoir. However, such development would likely be more gradual.** While not a part of the current application, the City of Newport News has made plans for a future expansion of the reservoir to the originally proposed dam location, thereby removing additional lands used by the Tribes for obtaining food and materials. The Pamunkey Neck is the primary hunting ground for all three tribes. This area is also used by the Mattaponi Tribe to gather native wild plants for food, medicinal and ceremonial uses. Animals displaced by the reservoir and subsequent development would be forced to relocate to other habitats and would overcrowd those areas, forcing additional competition for food sources which would result in an overall negative impact on the Tribes' source of game. Similar impacts to trapping and gathering habitats both within the Cohoke Valley and along the Mattaponi River would also be expected. The Mattaponi tribe is concerned that chemical changes in the Mattaponi River could adversely affect native plants growing along the river that are important to the Tribes as food and for medicinal and ceremonial uses. Because hunting, trapping and gathering for subsistence is vital to the Tribes (and possibly to other low-income populations in the area), further disruption of their ability to obtain food from these sources would appreciably exceed such impacts to the general population.

(g) Physical Barrier Between Reservations: The reservoir is proposed to be constructed directly between the Pamunkey and Mattaponi reservations. As County Route 626 would be reconstructed on top of the dam, access between the reservations by road would not be disrupted. However, the Tribes believe they would be further isolated socially and culturally from one another by the physical barrier of a reservoir in this location. Only the Mattaponi and Pamunkey Tribes would be affected by cultural isolation of their reservations from one another; therefore this effect would appreciably exceed such impacts to the general population.

(h) Reservation Expansion/Tribal Land Reclamation Efforts: The Mattaponi and Pamunkey Tribes fear that construction of a reservoir at this location would preclude their ability to expand their reservations. These Tribes have indicated a desire to obtain additional land in order to enlarge their current reservations. The Mattaponi and the Pamunkey Tribes have been attempting to reclaim areas they view as their historic tribal lands and that have special cultural and religious significance to them. Property values may or may not increase without the presence of the reservoir; however, the County's planned residential and light commercial development around the reservoir will likely increase the

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developmental potential and property value of other lands. Therefore, the cost of additional land purchases is likely to become prohibitive for the Tribes. Only the Mattaponi and Pamunkey Tribes would be affected by the lack of ability to expand their reservations; therefore, this effect would appreciably exceed such impacts to the general population.

(i) Loss of Rural Character of the Local Area: The Tribes fear a loss of privacy will accompany the loss of the rural character of the area. The County has plans for residential and light commercial development around the reservoir, and the recreational potential of the reservoir is likely to further increase development of summer and weekend homes. Such development would change the rural and agricultural setting of the area and further reduce the habitat available for game animals on which the Tribes depend for a source of food. The loss of rural character would impact practices which are important to the subsistence and culture of the Tribes.

(6) Mitigation Measures Available: When environmental justice impacts could occur, the President's Memorandum accompanying Executive Order 12898 directs that mitigation measures be identified. All of the Tribes have indicated that, in their opinion, there are no measures that would adequately mitigate for the losses identified in this analysis. Despite this belief, they agreed to discuss possible mitigation measures with the District and the permit applicant during the NHPA Section 106 Memorandum of Agreement discussions. The Mattaponi and Pamunkey Tribes were careful to remind all parties during these discussions that they were participating in this process not because they believed the loss of Traditional Cultural Properties and other adverse environmental effects could be mitigated for, but because they did not want to be left with no mitigation at all if the permit were granted.

Each of the three Tribes and the applicant proposed a number of specific suggestions for appropriate mitigation measures. Types of mitigation discussed during these discussions included cash payments, creation of one or more museums to house and showcase tribal artifacts, and purchase of additional land to expand the size of the two reservations. Dollar amounts and types of proposed mitigation varied widely between the permit applicant and the Tribes. Each Tribe chose to discuss potential mitigation measures separately from the other Tribes and the other consulting parties; therefore, the District, ACHP and VDHR met with each tribe and the applicant in separate meetings. The Tribes also asked that their specific proposals be kept confidential to the maximum extent possible.

Initially, the District worked with the City of Newport News and the Tribes in an attempt to come to a mutually agreeable resolution of the mitigation issue, or at least identify an acceptable range of mitigation alternatives. Such agreement would have been helpful to me in judging what would be appropriate mitigation for the impacts of the project to environmental justice. Ultimately, however, no agreement was reached between the City and the Tribes as to what measures might be acceptable to both sides. Discussions were discontinued shortly after I announced my preliminary intention to deny the permit in June 1999. The City of Newport News asserted that the District's handling of the matter was both "inconsistent" and "questionable"; and strongly urged me to continue holding meetings in order to come to a conclusion on what would constitute appropriate mitigation. The District discontinued discussions at that time because there was no longer a federal undertaking in the offing. Both the Virginia Department of Historic Resources and the Advisory Council on Historic Preservation agreed that this was the proper course of action. Furthermore, the Tribes indicated they did not intend to return to these mitigation discussions unless it became clear that the permit for the reservoir would be granted. Without the active participation of the Tribes, I believed that such meetings would not be helpful to the District's decision-making process on the question of environmental justice-related mitigation measures. Furthermore, at the

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last meeting held with each tribe as well as in subsequent letters, the City of Newport News had indicated that they had made their "...best and final financial proposal."

(7) Summary of Findings on Environmental Justice: The Norfolk District has determined that the Mattaponi, Upper Mattaponi, and Pamunkey Tribes would suffer the following disproportionately high and adverse environmental effects as described by Executive Order 12898 if the permit for the King William Reservoir were granted:

- Construction of the proposed King William Reservoir project would have a combined impact on the natural and physical environment that has the potential to significantly and adversely affect the Mattaponi, the Upper Mattaponi and the Pamunkey Tribes;
- The adverse cultural, social, economic and ecological impacts to the Tribes are interrelated to the adverse impacts to the natural and physical environment that would result from the proposed King William Reservoir project; and
- The additive environmental effects of the project would be significant and would or may have an adverse impact on the Tribes that appreciably exceeds or would likely appreciably exceed the effects on the general population.

The City of Newport News claims that these effects are only perceived by the Tribes rather than being real and that the scientific reports they have compiled do not agree that such effects would actually result. Many of these effects might not be perceptible to non-Native Americans living in the same general area as the Tribes, but this does not lessen the impact felt by the Tribes. Rather, it highlights the disproportionate nature of such impacts. While the applicant's individual studies did not predict substantial direct impacts to the Mattaponi River and its resources from the single effects they evaluated, these studies revealed the lack of information concerning cumulative and indirect adverse impacts that would occur from the additive effects of these changes. The magnitude of these effects is unknown, and cannot be accurately predicted, especially in conjunction with other projects that may follow. Based on the discussions between the Tribes and the City to date, I have determined that the potential socioeconomic, cultural, and spiritual losses that the Tribes would suffer as a result of the construction of the reservoir and the withdrawal of water from the Mattaponi River could not be adequately compensated. (For a detailed discussion of the District's environmental justice analysis, see the District's report entitled "King William Reservoir Environmental Justice Analysis.")

(8) Comments Received on the RROD Regarding Environmental Justice: Comments on this issue were received from the following:

City of Newport News (on behalf of RRWSG), Comments to Norfolk District, U. S. COE
Recommended Record of Decision (RROD): March 20, 2001 and IWR Special Study:
March 1, 2001, Historical/Cultural Resources and Environmental Justice, (4 May 2001)
Ed Maroney, City Manager, City of Newport News
Joe S. Frank, Mayor, City of Newport News
James S. Gilmore III, Governor of Virginia
Herbert H. Bateman, Jr., Councilman, City of Newport News
Charles C. Allen, Vice Mayor, City of Newport News
Joseph A. Landrum, P.E.

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George A. Somerville, Troutman Sanders Mays & Valentine
Bradford Worthington
Institute for Public Representation, on behalf of the Mattaponi Tribe
Southern Environmental Law Center
Wesley Pullman
Sierra Club, Virginia Chapter
Nancy Howard, employee of Newport News
Mark Fowler, Associate Professor of Philosophy, College of William and Mary
William P. Miles, Chief, Pamunkey Reservation
Institute for Public Representation (on behalf of the Mattaponi Tribe)
L. W. Custalow, M.D., (Mattaponi Tribe)
James Ryan, Troutman Sanders Mays & Valentine
National Association of Social Workers (Virginia Chapter)

The City of Newport News and City Manager Ed Maroney stated that Newport News has been engaged in an on-going and productive consultation with the Native American Tribes in King William County on their own initiative, and had met with the Mattaponi and Pamunkey Tribal Councils nearly a year before the Executive Order on Environmental Justice was issued. They listed steps they had taken on environmental justice issues and criticized the District for not noting these in the RROD. Governor Gilmore and Nancy Howard also stated that the RROD does not accurately reflect efforts made by Newport News in addressing environmental justice issues. Their letters set forth multiple examples of the City's efforts to resolve issues of concern to Native Americans, including mitigation efforts, efforts to protect water quality and historic properties, including sites not eligible for listing on the National Register. The City of Newport News states "It seems that the Norfolk District has gone out of its way to be sure that the RRWSG is portrayed, quite unfairly, as insensitive to tribal (as well as environmental) concerns." These comments are addressed in detail in the Final RROD in Section 8 m. – Historic Resources and Traditional Cultural Properties and in response to a letter from Ms. Nancy Howard of Newport News Waterworks.

The City of Newport News disagrees with the District's interpretation of the requirements of the environmental justice review as well as the effects that the King William Reservoir would have on low-income and the minority population. Also, the City of Newport News criticized the District for not giving appropriate weight to the applicant's successful efforts in mitigating the concerns of the African-American community on Route 626. Governor Gilmore and Councilman Bateman expressed similar concerns.

I am aware that the City of Newport News had met with members of this community in October 1997 and so stated on page 140 of the RROD, as well as in my Chronology of Section 106 Coordination and Environmental Justice Issues. (A copy of this chronology, which is listed as a reference in the RROD, was provided to the City of Newport News after publication of the RROD.) In a memo dated 23 October 1997 from David Morris, the City of Newport News informed the District that on 18 October 1997, they met at the King William Senior Center on Route 30 with individuals who own property and/or reside along the Route 626 corridor, within the area potentially impacted by the construction of the Reservoir. They indicated that letters had been sent to approximately 20 property owners to invite them to the meeting. The purpose of the meeting was to involve all groups, and in particular minority groups, (Route 626 is a predominately African-American community) and to solicit from them any concerns or observations they may have regarding traditional cultural property ties to the area. The memo on this

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meeting indicates that the only questions asked by the five African-American attendees were related to property issues and there was no mention of any other concerns. I have not been made aware of any concerns expressed by these African American families living on Route 626 or any efforts to mitigate impacts to this group. In fact, the RRSWG stated in the FEIS that no homes would be displaced and that this community would not be adversely impacted. Furthermore, the RRWSG did not specifically mention this African-American population in the information they provided for the discussion of environmental justice or socioeconomic impacts in the FEIS.

In a letter dated 22 April 2001, Mark Fowler, Associate Professor of Philosophy, College of William and Mary, rejected the comment provided by Vice Mayor Charles Allen in his 26 May 2000 letter that the District's analysis neglects the other minority and low income populations on the Peninsula. Mr. Fowler stated that the Vice Mayor's criticism "...is flawed because it rests on questionable factual assumptions, misrepresents environmental justice ideals and ignores the special environmental justice issues that often arise when Native American traditional cultures are involved." He contends that "In the case of Native Americans, therefore, we may in effect be depriving them of their freedom to exercise their religion by adversely affecting the land or water central to their traditional/religious practices." Mr. Fowler believes that the City of Newport News and Vice Mayor Allen misunderstand some of the fundamental tenets of environmental justice. He stated that no single group should be compelled to disproportionately bear the costs of progress because they can offer the least political resistance. The District agrees that the King William Reservoir project would affect the land and water resources central to the tribes' traditional/religious practices. This is one of the principle impacts that led me to recommend denial of the project.

The City of Newport News contends that on page 143 of the RROD the District erroneously attributed comments to Vice Mayor Allen that he did not make regarding impacts to minority populations. There is no reference on page 143 of the RROD to Vice Mayor Allen's letter and no comments were attributed to him on that page. The discussion of this issue was a paraphrase of comments from various letters from the City of Newport News staff and representatives.

Newport News Councilman Herbert H. Bateman, Jr. expressed his belief that the District's recommendation was made based upon my personal views about the impact of the proposed project on Native Americans. He believes that the District used objections from Native Americans to reject the project rather than working to find common ground between the Native Americans and the applicant such that the project could be built.

My recommended decision was not based on my personal views. My staff and I have made a concerted effort in working with the applicant and interested parties to resolve these objections from the Native Americans. As discussed in the RROD, the Norfolk District staff met on numerous occasions with the Tribes and Newport News to explore potential measures to mitigate impacts to the tribes.

Councilman Bateman and Vice Mayor Charles Allen suggested that the District's views on the project have shifted over the past two years. They contend that the original emphasis was on water need justification, then switched to environmental and cultural impacts. The record demonstrates that the District has been consistent in expressing concern over (1) lack of demonstrated need for the project, (2) impacts to the environment and (3) impacts to Native Americans. The fact that one or more of these issues received more or less emphasis in any particular document prepared by the District does not indicate, nor mean, that the District's focus has "shifted."

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Councilman Bateman stated that the District's concerns for Native Americans would be more understandable if the project impacted the tribes either by taking tribal lands or by degrading the environment where they live. He suggested that claims of economic and cultural impacts on Native Americans in the RROD are undefined and unsubstantiated. Impacts to the tribe are not undefined or unsubstantiated. The area of the proposed reservoir is part of the original lands held by the tribes and therefore, is significant to them both historically and culturally. The RROD contains a full discussion of the economic and cultural impacts to Native Americans in Sections m., q. and t.

Governor Gilmore, Mayor Frank, Councilman Bateman, George Somerville and Joseph Landrum stated their belief that concern for environmental justice should not only focus on the Native Americans but should also consider that by denying the Peninsula a reliable and affordable supply of water, economic opportunities and the quality of life of many low-income and minority populations living in Newport News and the Peninsula will be affected. Also, Governor Gilmore stated that any disparate adverse impact borne by the Mattaponi, Upper Mattaponi, or Pamunkey Tribes as a result of this project must be balanced against the benefit to the total communities and to the Commonwealth as a whole and that these impacts can be appropriately mitigated.

In making permit decisions, the Corps analyzes the benefits which reasonable may be expected to accrue from the proposal against its reasonably foreseeable detriments. In this case, my RROD concluded that the detriments of the proposal, including impacts to wetlands, water quality, Native Americans, and other resources outweighed the benefits of the proposal. In accordance with the Environmental Justice Executive Order and guidance, the focus of the Corps' analysis is on disproportionate effects of an action on minority and low-income populations. If denial of this application would in fact result in a lack of reliable and affordable water supply, such an effect would not appear to be a disproportionate impact on minority and low-income populations alone, but rather would appear to affect all RRWSG service area residents alike. Further, by recommending denial of this particular proposal, the District is in no way eliminating the RRWSG's ability to provide a reliable and affordable water supply as several alternatives are available to meet the need with fewer environmental impacts.

Governor Gilmore stated that neither Executive Order 12898 nor guidance developed by the federal agencies require denial of permits or prohibition of projects where no intentional discrimination can be shown. Rather, a balance needs to be struck between adverse impacts, mitigation of those impacts, and the benefits of the project to both the minority community and the community at large. I agree with these statements. My recommendation of denial is not based solely on environmental justice impacts, but on the project's potential to result in significant direct, indirect, and cumulative effects as defined by NEPA, in significant primary and secondary effects as defined by EPA's 404 (b)(1) Guidelines; and other public interest review factors.

The National Association of Social Workers (Virginia Chapter) stated that the Mattaponi and Pamunkey Tribes have a history which precedes that of our own in the Commonwealth of Virginia. This history is reflected in a treaty enacted in 1677 which should not be violated under any circumstances. They stated that the Mattaponi have interacted with the Citizens of the Commonwealth in a responsible and peaceful manner and contend that further erosion of the Indian peoples' land and culture would be to continue injustice of this most intolerable nature. The Institute for Public Representation (IPR), representing the Mattaponi Tribe, and the National Association of Social Workers (Virginia Chapter), feel that the effort to provide for water needs has resulted in a controversy with human rights implications. They stated their

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belief that the proposal would threaten the life and culture of the Mattaponi Nation. They stated that if the Mattaponi believe the project would endanger their survival as a people, then it would.

IPR, the Sierra Club and the Southern Environmental Law Center believe that the Native American population would suffer a disproportionate impact if the reservoir is permitted as the result of adverse impacts to fishing, shad hatcheries, and archaeological resources, as well as the creation of a physical barrier and the loss of privacy. They contend that because of cultural ties to the river and area surrounding the proposed reservoir site, the Mattaponi Tribe would suffer a loss that is difficult to comprehend by non-native Americans.

The Norfolk District has considered the Native American history and the 1677 Treaty in the decision-making process. I agree that the proposed project would adversely affect the Mattaponi Nation both physically and perceptually, and the RROD reflects these findings. As stated in the RROD, the spiritual and religious importance of the River and the surrounding land is a vital cultural value which may be difficult for non-native people to understand. However, lack of understanding of this value by non-Indians does not invalidate it. Rather, it emphasizes the disproportionate nature of effects on the value.

However, Governor Gilmore contends that the Tribes' belief that the reservoir would violate the "interrelatedness of all living things" and "the responsibility which Indian people have for maintaining their ancestors' lands" should be respected, but that it does not mean that such beliefs must always prevail. He stated that to adopt as public policy the Tribe's desires "to maintain the earth in the condition in which it was entrusted to all of us" would bring a complete halt to all future land development. While I agree that such beliefs must not always prevail in any given circumstance, in this instance, these impacts would occur concurrently with other adverse impacts to Native Americans, wetlands, water quality and other natural resources. In light of the unjustified need, the degree of adverse impacts and the availability of other alternatives, the proposal was determined to be contrary to the public interest.

Governor Gilmore stated his belief that the reservoir project would not adversely impact the hunting and fishing rights of the Mattaponi and Pamunkey Tribes. He believes that the conditions of the VWPP ensure no impact on water levels, that changes to salinity would be virtually undetectable and that the project would have no adverse impact on the fisheries in the Mattaponi and Pamunkey Rivers. He stated that the project would not reduce game in the vicinity of the reservations, rather, he believes that wildlife habitat provided by the reservoir and buffer would likely enhance the numbers and types of game and waterfowl species in the area. Governor Gilmore has offered no substantiation for his contention that the Tribes' fisheries would not be impacted. Some species that favor open water would undoubtedly increase if the reservoir is built. However, the RROD clearly describes the manner in which the wildlife habitat at the reservoir site would be reduced not enhanced by the direct and indirect impacts of the project. The direct loss of wetlands and upland resources associated with the proposal, as well as indirect impacts associated with the County's planned development in the area would result in a loss of game in the vicinity of the reservation.

Governor Gilmore contends that the Norfolk District should not have concluded that consensus between the Tribes and the applicant was not possible when the consultation process was still ongoing. He stated his belief that if the process had been allowed to continue, agreement would have been reached and any remaining impacts would have been mitigated to the benefits of the Tribes and residents of the Peninsula. He stated his belief that consultations continued with individual tribal communities at their reservations

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with the participation of District staff as well as the ACHP and VDHR, after the District had made a unilateral decision to terminate consultation.

Section 106 consultation has been suspended, but not terminated. Termination of Section 106 consultation occurs when the federal agency, the SHPO or the Council determines that further consultation will not be productive (36 CFR 800.7 (a.)). In this case, due to the preliminary position of denial, there would no longer be a federal action. It did not appear to the District that resolution of the Native American issues would have been possible. Consensus would likely not have been reached between the applicant and the tribes had consultation continued, however, as outlined in the RROD, lack of consensus was not the reason for suspending Section 106 consultation. This issue is also discussed in the Section m – Historic Resources of the Final RROD.

It is correct that I had reached a preliminary position that issuance of a permit for the King William Reservoir project would not be in the public interest before the last meetings were held with the tribes on 13 and 22 May 1999. However, I felt that it would be inappropriate to announce my position to the City until I had informed the North Atlantic Division, HQUSACE and the Assistant Secretary of the Army for Civil Works. Those briefings were scheduled for 27 and 28 May 1999. Due to the City of Newport News' continued concern over delays in permit processing, the District staff had been directed not to cancel or reschedule any meetings with Newport News without the concurrence of both the District Engineer and Mr. Randy Hildebrandt. Therefore, canceling the meetings with the Tribes would have required that I inform Mr. Hildebrandt of my position before I had briefed my superiors.

George Somerville of Troutman Sanders Mays & Valentine commented that the Mattaponi Tribe is not "competing for lands" in the vicinity of the proposed reservoir since Cohoke Creek is located in the Pamunkey River Watershed and is not adjacent to the Reservation or in close proximity to it. Mr. Somerville stated his belief that the Mattaponi Tribe's efforts are to increase land holdings along the Mattaponi Watershed. Therefore, he believes that the Mattaponi Tribe is not likely to shift its focus away from sites along the Mattaponi River to lands across Route 30 in the Pamunkey River basin.

The RROD discussed the desire of the Tribes (Mattaponi and Pamunkey) to increase their land holdings in the area. As tribal resources are limited, it is understandable that land acquisition would proceed in a piecemeal fashion. Lands in the vicinity of Cohoke Creek may be targeted by one or more of the Tribes for acquisition. Both Tribes have identified these areas as culturally important to them and reiterated that sentiment in their most recent comments (see 2 May 2001 letter from William P. Miles, Chief, Pamunkey Tribe; 4 May 2001 letter from Institute for Public Representation, representing Mattaponi Tribe; and 30 April 2001 letter from L. W. Custalow, M.D., Mattaponi Tribe).

Governor Gilmore stated his belief that the impacts on baptisms and Easter Sunrise services on the Mattaponi River, as well as impacts to the natural environment can be adequately and appropriately addressed. He believes that there would be no measurable changes in the physical qualities of the Mattaponi River and that the project would not reduce or inhibit tribal access to traditional locations of these activities. As stated in the RROD, the Mattaponi Tribe has many religious and spiritual ceremonies closely associated with the River, which they consider "sacred waters." The Tribe believes that disruption or "defiling" of the River and its flow would create an imbalance in the circle of life and dishonor the Tribe's ancestors and Mother Earth. It is not access to the River that would be disturbed; rather it is the spiritual and religious aspect of the Mattaponi River to the Tribe. The Tribe considers this

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to be a vital cultural value which may not be fully appreciated by non-native people. However, lack of appreciation by non-Indians does not depreciate or invalidate this value to the Tribes.

Governor Gilmore disagrees with the conclusion in the RROD that residential growth associated with the project might impact the tribes. He said the FEIS indicated that the project is not likely to promote much new residential or business growth in the area. Also, King William County has indicated that building, land disturbing activity and clearing or vegetation removal would be severely restricted within the reservoir buffer areas. I acknowledged in the RROD the RRWSG's statement in the FEIS that there would be minimal planned development around the reservoir. However, I also noted the 1997 King William County Comprehensive Plan which indicates that "Moderate residential development is intended within the Watershed Protection Area and at its periphery a narrow area is designated for moderate mixed development of residential, light commercial and planned unit development." Although King William County might restrict building, land disturbance and clearing activities within the 100-foot wide buffer immediately surrounding the reservoir, they have clearly planned for development in the area around the reservoir. The potential impacts of this development include those to hunting and gathering grounds, tribal land reclamation efforts and loss of privacy. Furthermore, human disturbances from such development would change the rural and agricultural setting of the area, further reduce the habitat available to wildlife and reduce the habitat value of the proposed buffer zone surrounding the reservoir.

The Sierra Club suggested that construction of the reservoir would result in higher water rates for all Newport News Waterworks customers and disproportionately burden the customers with limited incomes in the Cities of Newport News and Hampton. They stated their belief that this in turn would result in the economically disadvantaged populations subsidizing an expanded water supply infrastructure for the more affluent residents and businesses relocating to James City and York County. As the District's recommendation is that the permit be denied, the suggested impacts that construction of the reservoir might have on minority or low income populations in Hampton and Newport News would not occur. Prior to any issuance of a permit on this proposal, such potential impacts would need to be evaluated.

9. Alternatives Considered in EIS: A total of 35 alternative components were identified and reviewed in the FEIS for their availability, cost, technological reliability, and environmental impacts. The RRWSG used a fatal flaw analysis, then applied a methodology based on the 404 (b) (1) Guidelines to screen the alternatives for "practicability." District staff had informed the RRWSG that this approach would not take the place of the Corps' 404 (b) (1) practicability analysis and public interest review which would be conducted after the close of the EIS comment period. The following is the list of alternative components as they appeared in the FEIS (Table 3-4). Alternative components 32 through 35 were added at the request of the District and the federal advisory agencies.

1. Lake Genito
2. Lake Chesdin
3. Lake Anna
4. Lake Gaston
5. Rappahannock River (above Fredericksburg)
6. James River (above Richmond)
7. City of Richmond Surplus Raw Water
8. City of Richmond Surplus Treated Water
9. James River (between Richmond and Hopewell)
10. Ware Creek Reservoir

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11. Ware Creek Reservoir and Pamunkey, Mattaponi and/or Chickahominy River Pumpovers
12. Ware Creek Reservoir and James River Pumpover (above Richmond)
13. Black Creek Reservoir and Pamunkey River Pumpover
14. Black Creek Reservoir and James River Pumpover (above Richmond)
15. King William Reservoir and Mattaponi River Pumpover (KWR-I, KWR-II and KWR-IV)
16. King William Reservoir and Pamunkey River Pumpover
17. Chickahominy River Pumping Capacity Increase
18. Chickahominy River Pumping Capacity Increase and Raise Diascund and Little Creek Dams
19. Aquifer Storage and Recovery, Constrained by Number of Wells
20. Aquifer Storage and Recovery, Unconstrained by Number of Wells
21. Fresh Groundwater Development
22. Groundwater Desalination as the Single Long Term Alternative
23. Groundwater Desalination in Newport News Waterworks Distribution Area
24. James River Desalination
25. Pamunkey River Desalination
26. York River Desalination
27. Cogeneration
28. Wastewater Reuse as a Source of Potable Water
29. Wastewater Reuse for Non-Potable Uses
30. Additional Conservation Measures and Use Restrictions
31. No Action
32. Black Creek Reservoir and Mattaponi River Pumpover
33. Ware Creek Reservoir (Three Dam Alternative) and Pamunkey River Pumpover
34. Side-Hill Reservoir
35. Smaller King William Reservoir with Two River Pumpovers

The City of Newport News executed a specific and detailed agreement with the King William County Board of Supervisors in November of 1990 for the King William Reservoir. The District staff learned of the existence of this host agreement in late 1993 or early 1994, but was unaware that it had actually been executed before the EIS process began. The District staff only learned of the date of the agreement in January 1998, when a copy was provided by an opponent of the proposal who had obtained it from Newport News through the Freedom of Information Act. Although the City of Newport News informed the District and the federal agencies that they were seeking the least environmentally damaging alternative through the EIS process, no matter what it might turn out to be, it appears that the King William Reservoir had already been chosen as their preferred alternative before the alternatives analysis was performed for the Draft EIS.

The RRWSG's screening resulted in the elimination from further consideration of all but six of the original 31 alternative components because they would either fail to meet the RRWSG projected needs, were too costly, the technology was considered experimental or there might be political problems in obtaining local approval. These six alternative components were combined to create three reservoir alternatives that would meet the RRWSG's projected 39.8 mgd deficit. The EIS carried forward for detailed review the following alternatives: a reservoir on Ware Creek between James City and New Kent Counties with pump-over from the Pamunkey River (alternatives 11, 21, 23, 30), a reservoir on Black Creek in New Kent County with pump-over from the Pamunkey River (alternatives 13, 21, 23, 30) and a reservoir on Cohoke Creek in King William County with pump-over from the Mattaponi River

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(alternatives 15, 21, 23, 30) which is the applicant's preferred alternative, and the No Action alternative (alternative 30).

The results of the applicant's screening analysis is presented on Table 3-4 of the FEIS. Based on the information provided by the applicant, the District and the federal advisory agencies generally did not disagree with the RRWSG's conclusions, but identified four more alternative components that should be reviewed in the FEIS (alternatives 32, 33, 34 and 35). The RRWSG's analysis also eliminated these alternatives from further consideration because they would either fail to meet the RRWSG's projected needs, were too costly or might not be acceptable to the host localities. In their 11 April 1996 letter commenting on the Draft EIS and Supplement to the Draft EIS, EPA stated their belief that several alternatives were eliminated from consideration without substantial justification including the Black Creek Reservoir with pumpover from the Mattaponi River and the King William Reservoir with pumpover from Pamunkey River alone. The federal advisory agencies questioned why it would be feasible to use a Pamunkey River pumpover for an expanded King William Reservoir, but not as the single pumpover option for the proposed King William Reservoir (alternative 16).

10. Alternatives Available to the Applicant:

a. Non-Reservoir Components of the RRWSG's Plan (alternatives 21, 23 and 30): The RRWSG's 2040 plan outlined in the FEIS provides for 23.2 mgd of safe yield from the King William Reservoir, 4.4 mgd from fresh groundwater and 5.7 mgd from brackish groundwater and 7.1 to 11.1 mgd from conservation and use restrictions. These alternatives were all reported by the RRWSG to be feasible. The combined safe yield of the non-reservoir components of this plan is 17.2 to 21.2 mgd. The City now claims that they would not be able to obtain permits for the 4.4 mgd fresh groundwater component of their plan and that without the reservoir, conservation measures and use restrictions would provide only 4.8 mgd of safe yield instead of the 7.1 to 11.1 mgd stated in the FEIS. Combined with the 5.7 mgd from their new groundwater desalination plant, the City reports that the non-reservoir components of their plan would only provide 10.5 mgd of safe yield benefit rather than the 17.2 to 21.2 mgd reported in the FEIS.

It should be noted that these groundwater and conservation alternative components were only considered in conjunction with the three reservoir alternatives and were not considered as components of any of the non-reservoir alternatives in the FEIS. The ability to conserve water should produce the same benefit no matter what other sources are considered to meet the need. In 1998, Newport News Waterworks brought on line their new \$17 million brackish groundwater desalination plant that will produce 5.7 mgd of their predicted 2040 deficit for \$1.20 for 1,000 gallons of water and is expected to cover their demand for about 10 years. Even if the City would not be able to obtain permits for the 4.4 mgd of fresh groundwater, they may be able to obtain permits for more brackish groundwater wells. According to the minutes from a Newport News City Council Work Session held on 8 February 2000, if the Corps permit is denied, the City might request that the State Water Control Commission allow them access to more groundwater for further desalination efforts.

(1) Groundwater (alternatives 21 and 23): It should be emphasized that the District is not advocating the additional use of groundwater to supply the region's need unless it is determined by the state to be appropriate. The District recognizes that over-reliance on groundwater resources can result in depletion of aquifers, land subsidence and the disappearance of wetlands that are supported by those aquifers. Decisions on the availability, quality, quantity and acceptability of groundwater sources rests

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with the state. However, the IWR panel believes that the RRWSG's estimated groundwater yields may be low compared to actual aquifer capacity.

James City County has been able to avoid their anticipated water supply crisis by implementing long-term solutions that do not require dependence on reservoirs. They have accomplished this by requiring more intense water conservation efforts (i.e., voluntary water conservation) and by planning for the construction of a 6 mgd groundwater desalination plant. In February 1998, James City County completed a feasibility study of a desalination facility which indicated that reverse osmosis treatment of groundwater from the Potomac Aquifer was feasible to supply their needs. James City County has indicated that if the King William Reservoir were permitted, they would contract with Newport News for at least 2 mgd and possibly another 2 mgd of water if it is available. However, the James City County Board of Directors approved a water supply plan to pursue the desalination facility if the Corps permit for the King William Reservoir was not issued by July 2000. James City County currently has block water rates of \$2.50 per 1,000 gallons for use of less than 15,000 gallons and \$2.60 per 1,000 gallons for use of more than 15,000 gallons but less than 25,000 gallons per quarter. These rates are less expensive than Newport News Waterworks' current rate of \$2.73 per 1,000 gallons and proposed rate of \$3.59 per 1,000 gallons by the year 2006. James City County has reported that the desalination plant would cost less to build than its portion of the cost of the reservoir would be (\$9 million per 1 million gallons), although the cost of the water itself would be more expensive. The City of Newport News has indicated that James City County's withdrawal from the project would not stop the project from going forward. However, it may be assumed that some, if not all, of James City County's 4.4 mgd need would be met by their new groundwater desalination plant.

(2) Conservation (alternative 30): The Norfolk District and the federal agencies believe that the City of Newport News has underestimated their potential water savings from conservation. In their February 2001 report, the IWR panel also stated that the City of Newport News has underestimated the beneficial effects of conservation. The RRWSG's November 2000 water conservation analysis concluded that water conservation efforts above the regulatory driven new plumbing codes were not cost effective. They further claim that additional conservation efforts would not significantly reduce usage. According to the IWR panel, additional conservation through the retrofitting of older fixtures could reflect substantial savings. The new 1.6 gallon toilets represent significant water savings over old fixtures using 5 to 7 gallons and even the now outdated 3.5 gallon low-flow fixtures. Rate restructuring and a rebate program for low flush toilets and plumbing retrofit could be considered as an incentive to reward conservative users. Furthermore, the effects of increased conservation as population increases should also be considered in the RRWSG's calculation of the long-term benefit of conservation as well as the potential for conservation at military and federal installations.

b. Other Non-Reservoir Alternatives: Certain non-reservoir alternatives identified in the FEIS to supply the RRWSG's stated 39.8 mgd need were not investigated in detail because they were eliminated early in the alternatives analysis for various reasons. If these alternatives are still available, they might provide additional incremental supplies as indicated by IWR or the entire RRWSG projected deficit as a one-time project. With the limited information that is available at this time, there currently appear to be no significant or unacceptable adverse environmental impacts related to the following alternatives. When there is a need in the future or in the event that the RRWSG's risk of shortage is actually greater than IWR predicts, these sources, either separately or in combination, could potentially meet some or all of the shortage.

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(1) Purchase of Surplus Treated or Raw Water from the City of Richmond (alternatives 7 and 8): The FEIS indicated that the City of Richmond surplus raw water would provide a safe yield benefit on the order of the Peninsula's stated deficit of 39.8 mgd, however a treated water safe yield benefit of 7.1 mgd instead was assumed. The RRWSG reported that the alternative was not feasible because the Richmond Regional Planning District Commission had taken a strong position against lower Peninsula withdrawals from the James River at Richmond. The FEIS indicated that the safe yield benefit of the City of Richmond surplus treated water would be 23.9 mgd. The RRWSG estimated that the cost of this alternative per mgd of treated water would exceed the RRWSG's adopted affordability criterion and the availability of this water was uncertain.

A study of the Richmond regional water demand was undertaken as part of the review of the proposed Henrico County Water Supply Intake. The City of Richmond and Henrico County developed a Regional Flow Management Plan (RMP) for the James River in the Falls of the James to protect instream resources in the region. As part of the plan, Richmond water treatment plant withdrawals would not exceed 150 mgd. The Henrico County water treatment plant was permitted to withdraw a maximum of 55 mgd. Henrico County currently purchases approximately 32 mgd from the City of Richmond. When the Henrico County Treatment Plant goes on line in 2002, Richmond would have this amount of water available for other users. The City of Richmond has indicated in the past that they intend to market this additional water to other users. Utilizing information collected for the Henrico County FEIS (July 1995), the Richmond regional demand projections would be 153 to 156 mgd in 2010. The combination of the Henrico County and City of Richmond water treatment plants could supply up to 205 mgd (150 mgd-Richmond and 55 mgd-Henrico) which leaves a surplus of 49 to 52 mgd which could be marketed to other users, including the RRWSG.

(2) Withdrawal of Freshwater from the James River Above Richmond (alternative 6): In the FEIS, the safe yield benefit of this alternative was estimated to be between 7.1 and 7.9 mgd. The RRWSG reported that this alternative was not feasible because of the Richmond Regional Planning District Commission's position against Lower Peninsula withdrawals from the James River at Richmond. The RRWSG's estimated cost of this alternative per mgd of treated water would exceed their adopted affordability criterion. Also, the RRWSG determined that the intense competition between Richmond and Henrico County for James River water would severely delay their efforts to pursue this alternative.

The Regional Water Resources Plan for Planning District 15, dated December 1992, proposes to limit the major exportation of surface water to users outside the region, but does not preclude any of the water suppliers from marketing their excess water outside of the region. This plan specifically acknowledges the possibility that the RRWSG could obtain water from the James River:

"Regional Raw Water Study Group. To meet its projected water deficits of over 30 mgd by the year 2040, the RRWSG has identified numerous sources of water supply for possible use through the construction of new or expanded water intakes and pumping facilities. Some of the more significant of these proposals include: Lake Chesdin - 40 mgd intake; James River - 40 mgd intake in Chesterfield County above Bosher Dam; James River - new 40 mgd intake at the Richmond WTP to take surplus water; James River - purchase 20 mgd (30 mgd maximum) of treated water from the Richmond WTP..."

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Since the Richmond Regional Planning District recognizes the possibility of the RRWSG obtaining additional water from this region, it would not be prudent to eliminate this alternative for a smaller volume of water.

(3) Desalination of Brackish Water from the James River, the Pamunkey River or the York River (alternatives 24, 25, and 26: The FEIS reported that these alternatives would each provide a safe yield benefit of approximately 30 mgd.

(a) James River Desalination: The RRWSG considered treatment of the brackish James River water as experimental and technologically unreliable because of widely fluctuating salinity levels. They estimated that the cost per mgd of treated water would be higher than their adopted affordability criterion. Because the pesticide Kepone is known to be present in sediments in the James River below Hopewell, and could become re-suspended, the Virginia Department of Health considers this to be one of the least desirable of the RRWSG's proposed alternatives. The Department's position is that the best available source of water supply should be used. However, they informed the RRWSG, "We are, however, receptive to the use of raw water such as the James River below Hopewell in a situation where appropriate treatment is provided and it is well documented that no other source of potable water is available." Therefore, the RRWSG concluded that this alternative would not be practical. There clearly appear to be other raw water sources available to the RRWSG; however, it should be noted that the Health Department has not rejected the use of this water as indicated by the RRWSG.

(b) Pamunkey River Desalination: The RRWSG claimed that since this alternative did not include new raw water storage, and a likely river MIF would severely limit or preclude Pamunkey River withdrawals for extended periods, they concluded that the safe yield benefit would be negated and the alternative would not be feasible.

(c) York River Desalination: Due to raw water quality variability and treatment control concerns, and the lack of experience in treating water from a source of this type, the RRWSG considered the York River desalination alternative as experimental and not technologically reliable. Also, the RRWSG estimated that the cost per mgd of treated water benefit would exceed their adopted affordability criteria. The RRWSG claims that the use of desalination to produce potable water from brackish surface water remains experimental and actual construction and operating cost data is lacking. Therefore, the cost analysis of these alternatives in the EIS was conducted using ocean-based sources.

Desalination has been traditionally more expensive than the operation of a reservoir; however, as technology improves, the feasibility and cost effectiveness of the various desalination methods continue to increase. According to IWR, some methods, such as multi-stage flash distillation, are apparently both efficient and less expensive. Desalination is generally energy intensive and disposal of the brine from the desalination process also poses a potential environmental problem for fish and wildlife in the receiving waterway. However, brine discharged from the treatment of brackish water would not be as highly saline as from the treatment of seawater and could be diluted, possibly by mixing with wastewater, before being discharged. In the FEIS, the RRWSG reported 1994 costs between \$5.37 and \$6.14 per 1,000 gallons to desalt ocean water and predicted that desalting the brackish waters of the York River would cost as much as \$8.00 per 1,000 gallons. However, in a report dated 15 November 2000, the City of Newport News estimated that it would cost \$340.2 million to treat brackish water from the York River and \$382.0 million to treat salt water from the Atlantic Ocean. Therefore, it appears that brackish water desalination has now become less expensive than ocean water desalination.

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According to the Corps's Institute for Water Resources, desalination by reverse osmosis became more economical in the early 1990's when computer management of the process allowed much greater efficiency. In fact, a desalination plant under construction by the Tampa Bay Water Authority in Florida for the year 2002 will reportedly produce 25 mgd for \$2.08 per 1,000 gallons of water over the next 30 years. Although Newport News Waterworks reported that the reservoir would produce water for \$1.23 per 1,000 gallons, they recently informed their customers that water rates would increase from the current rate of \$2.04 per hundred cubic feet of water to \$2.68 per hundred cubic feet of water by the year 2006 to pay for the King William Reservoir and other improvements. This converts to a current rate of \$2.73 per 1,000 gallons that will increase to \$3.59 per 1,000 gallons. Seawater desalination is generally more energy intensive and, therefore, more expensive than the desalination of the brackish surface water sources available to the City of Newport News. However, at the Tampa Bay plant, heated water from an adjacent power plant would require less energy to move through the desalination membranes and would reduce the operation cost. Without the power plant, the cost is estimated to be close to \$3.00 per 1,000 gallons, which remains less expensive than the cost to Newport News customers from the implementation of the King William Reservoir. More information on how treatment, delivery, management, overhead and construction costs are figured into these two cases would be necessary in order to draw a direct comparison between Tampa Bay and Newport News. However, these numbers clearly demonstrate that desalination is not the extravagant option it once was and may actually compare much more favorably to the cost of the King William Reservoir than previously estimated. Furthermore, the costs associated with additional water treatment facilities are included in the applicant's desalination analysis, but not in the other alternatives. The Sierra Club commented that the Lower Peninsula might be able to qualify for a 50% matching grant under the Water Desalination Act of 1996. Therefore, the rapidly improving technology of recent years has made desalination more cost effective and reliable than it has been in the past and it may be more attractive to the RRWSG by the time their need arises.

(4) Chickahominy River Pumping Capacity Increase (alternative 17): A Chickahominy River Pumping Capacity Increase that would involve increasing the pumping capacity of the existing Newport News Waterworks Chickahominy River pumping station from 40 mgd to 61 mgd was one of the alternatives considered in the FEIS. This alternative was rejected early in the review process since the RRWSG reported that this alternative would provide only about 0.2 mgd of additional safe yield because it would likely trigger a more restrictive MIF requirement for the Chickahominy River for streamflow protection. However, the need for a more restrictive MIF requirement was not investigated, only conjectured. From the City's comments on the RROD, it appears that these modifications to the pumping capacity have been completed and Newport News Waterworks already has the ability to pump more than 40 mgd from the Chickahominy River (up to 61 mgd).

The IWR review indicates that a total of 5.2 mgd could be obtained from the existing system if the DEQ permit were modified to allow pumping to 61 mgd from the Chickahominy River. Although flows in the Chickahominy do not drop below 10 cfs because of pumping in any of IWR's simulations (the natural flow is sometimes less than 10 cfs), the increase in pumping from 40 to 61 mgd would reduce the average flow-by.

c. Other Alternatives Considered:

(1) Wastewater Reuse for Non-Potable Uses (alternative 29): The Virginia Department of Health is opposed to any consideration of direct recycling of reclaimed wastewater as a source of drinking water and would approve indirect recycling only after all other alternatives have been examined and when

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it is determined to be the highest and best source available. The Department of Health could not support the RRWSG's proposed indirect recycle alternative 28 since the amount of dilution and detention that could be provided in the Harwoods Mill and Lee Hall Reservoirs would not be sufficient. However, the Department of Health has indicated their full support for the concept of non-potable reuse of reclaimed wastewater. Therefore, as other alternatives were undoubtedly available, the District did not require the RRWSG to further investigate potable uses of wastewater for the FEIS, but did encourage further analysis of non-potable reuse as an additional conservation measure.

The Hampton Roads Sanitation District (HRSD) has nine treatment plants that handle a total of approximately 150 million gallons of wastewater per day, which is cleaned and returned to the local waterways. As an alternative to disposing of this water, HRSD actively supports and encourages using this highly treated wastewater for non-potable purposes. According to HRSD, wastewater reuse is a relatively common practice throughout the country, but Virginia has been slow to adopt the concept. Furthermore, the cooperation of the localities is required for such a program to be implemented. The RRWSG's projected need could be reduced by as much as 1 mgd if two recent requests for non-potable reuse of reclaimed wastewater by large use customers were implemented.

HRSD recently initiated a pilot program at its James River and York River Treatment Plants to explore the industrial uses of filtered, chlorinated effluent. Both projects have received preliminary approval. HRSD would like to supply an estimated 0.48 mgd of effluent from the James River Treatment Plant for irrigation at Riverview Farm Park, a new recreational facility in Newport News. However the City of Newport News would not commit to the project because the City has its own well which would provide less expensive water for irrigation. Also, HRSD would like to supply 0.6 mgd of effluent from the York River Treatment Plant to the Virginia Power Plant and the Amoco Oil Refinery in York County for cooling generators, feeding boilers, washing down and for fire and dust suppression. HRSD offered to sell reclaimed water to Newport News Waterworks for resale; however, Newport News declined this offer. As a result, HRSD and Amoco may work directly to pipe the water the one mile distance from the treatment plant to the refinery. If these two projects had been considered, they would have reduced the RRWSG's projected need by almost 1 mgd.

The use of reclaimed wastewater to irrigate the athletic fields at Menchville School and at a proposed park on a closed landfill site has also been discussed. HRSD can apparently produce this water for \$1.50 per 1,000 gallons, which is very economical when compared to an average cost of \$2.50 per 1,000 gallons of drinking water. The greatest cost involved in implementing wastewater reuse is the required infrastructure because a separate system of pipelines and pumps is required. In a report dated 15 November 2000 the City of Newport News estimated that it would cost \$241.9 million to produce and transport wastewater as compared to \$167.9 million to build the King William Reservoir.

I acknowledge that Newport News and the other RRWSG member jurisdictions cannot require their users to incorporate wastewater reuse. However, such opportunities to reduce the demand for potable water for industrial processing and irrigation should be investigated and encouraged as an additional conservation measure. I recognize that opportunities for wastewater reuse will initially be limited; however, it could eventually represent a considerable reduction in the need for increased potable water supplies. Furthermore, the more users there are, the less expensive the reclaimed water will be and the more attractive the process will become to others. Preliminary projections indicate that wastewater reuse could be economically beneficial to the power plant and refinery. HRSD estimates that the savings to local industries could far outweigh the initial costs for the new process and infrastructure. HRSD has

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apparently received inquiries regarding wastewater reuse from industries that are considering locating in the area. Also, Virginia's commitment to the Chesapeake Bay Initiative for restoring water quality in the Bay will likely encourage non-potable wastewater reuse within the RRWSG's 50-year planning period. Therefore, the high probability that non-potable uses of wastewater could significantly decrease the future need for new potable water supplies should have been taken into account when calculating projected need for the area.

In their comments on the RROD, the Southern Environmental Law Center informed me that in 2000, the Virginia General Assembly amended the State Water Control Law to "promote and encourage the reclamation and reuse of wastewater in a manner protective of the environment and public health..." Virginia Code Ann. 62.1 – 44.2. Therefore, it appears that the state recognizes the importance of encouraging wastewater reuse.

(2) Black Creek Reservoir and Pamunkey River Pumpover (alternative 13): The Black Creek Reservoir alternative would provide 18.1 mgd safe yield benefit. Like the King William Reservoir alternative, this alternative was considered in combination with 4.4 mgd from fresh groundwater and 5.7 mgd from brackish groundwater and 7.1 to 11.1 mgd from conservation and use restrictions for a total safe yield benefit of 35.3 to 39.3 mgd.

After the detailed delineation of the King William Reservoir site revealed a 653-acre wetland impact, the District and the federal advisory agencies announced to the RRWSG that the Black Creek Reservoir appeared to be the least environmentally damaging of the reservoir alternatives since it would impact the least wetlands (285 acres), involved no endangered or threatened species and few cultural resources. Shortly after the RRWSG was informed of this finding, New Kent County withdrew their cooperation and the RRWSG was unable to perform further environmental analysis of the Black Creek Reservoir alternative. The applicant suggested in the Draft EIS that the impacts of the Black Creek Reservoir would be greater than for the King William Reservoir, however this has not been substantiated since no further analysis of the Black Creek alternative was performed. The Black Creek Reservoir alternative was carried forward as a "No Action" alternative in the Supplement to the Draft EIS and the District proceeded with the best available information for the NEPA review.

As long as there are non-wetland alternatives that would meet the project purpose when the need arises, any alternatives involving wetland impacts would be presumed to be more environmentally damaging and unacceptable under the Corps regulations. Therefore, other reservoir alternatives such as Black Creek and Ware Creek that involve large wetland impacts could not be considered as the environmentally preferred alternative when non-wetland alternatives are available to meet the RRWSG's need. However, if non-wetland alternatives are not available and a reservoir is determined to be necessary in order to meet the RRWSG's future needs, a reservoir on Black Creek appears to be a practicable and feasible alternative (cost, technological reliability, etc.). As it was apparently eliminated for other than technical reasons that may not be insurmountable, it is possible that the Black Creek Reservoir alternative could once again become available to the RRWSG.

(3) Surplus Water from the City of Norfolk: In March 1999, the City of Norfolk reported to the District that it currently has between 32 to 45 mgd of surplus water, since the City of Virginia Beach started using water from Lake Gaston exclusively in 1997 and no longer buys water from the City of Norfolk. This alternative was not evaluated in the FEIS, and the exact amount of surplus and the length of time the water will not be needed by users in the southside of Tidewater have not been established. In

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the FEIS, the RRWSG evaluated the alternative of obtaining water from the City of Richmond, which is much farther distant than the City of Norfolk.

Therefore, the District wrote to the City of Norfolk on 22 March 1999 asking (1) Has Virginia Beach or any other users on the southside of Hampton Roads indicated a need for this surplus and a desire to obtain it from the City of Norfolk? (2) Would the City of Norfolk be able to supply treated or raw water to Newport News Waterworks to provide a treated safe yield of 23.2 mgd through the year 2040 and still meet its other expected obligations for that same period? and (3) Are there any restrictions on the sale of the City of Norfolk's water supply outside of South Hampton Roads? In a letter dated 5 April 1999, the Director of the City of Norfolk Department of Utilities reported "In the past six years, Norfolk has discussed the possibility of using some of Norfolk's surplus water with several communities in Southside Hampton Roads. These discussions are ongoing," and "Our ability to supply all of the 23.2 mgd treated safe yield required by Newport News could depend on new commitments that might be negotiated with southside Hampton Roads communities to satisfy their future water needs. For Norfolk to supply either treated or raw water to Newport News will require, at the very least, new treatment and/or transmission facilities and the possibility of this has not been discussed with Newport News." He indicated that there are no restrictions on the sale of Norfolk's water supply outside of South Hampton Roads.

The City of Newport News wrote to the District on 24 March 1999 that the City of Norfolk surplus water should not be considered an alternative to satisfy the RRWSG's long-term needs because it will be required to meet the long-term needs of South Hampton Roads and because it was not considered as an alternative in the EIS scoping process. During scoping, the District and the federal agencies agreed not to require the RRWSG to consider as an alternative obtaining water from Lake Gaston, because at that time the outcome of the City of Virginia Beach's Lake Gaston pipeline permit was still in the courts and there was substantial doubt that the RRWSG would legally be able to obtain water from that source. A Lake Gaston alternative should not be confused with the surplus water that the City of Norfolk reported that they now have available from their other sources.

In a letter dated 2 April 1999, the City of Virginia Beach responded that they did not agree with the City of Norfolk's reported ability to provide a total of 95 mgd of safe yield from their system and calculated the figure to more likely be 81 mgd. The City of Virginia Beach projected a need for an additional 12 mgd of treated water supply at some point between 2010 and 2020 and believes that they would be a leading candidate for any additional surplus from the City of Norfolk.

The City of Chesapeake responded that they project a deficit of 10.4 mgd by the year 2040 based on maximum daily demand rather than average demand. Their water demand projections show that additional water would be required by 2015. Their options are to purchase additional surplus from the Cities of Norfolk and Portsmouth and/or develop an entirely new water supply project. The City of Chesapeake believed that the City of Suffolk and Isle of Wight County might also need some of the City of Norfolk's surplus in the next ten to fifteen years.

Although their comments had not been solicited, the Western Tidewater Water Authority (City of Suffolk and Isle of Wight County) informed the District on 2 April 1999 that they disagreed with the City of Norfolk's claim of a 32 to 45 mgd surplus. Their reasons were legal issues concerning the operation of wells within the City of Suffolk and the City of Norfolk's sole claim to the Blackwater River. They also stated their belief that the southside communities would need the surplus water within the next 40 years.

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The District has not suggested that surplus water from the City of Norfolk would meet the RRWSG's projected long-term need of 39.8 mgd. It is clear from these responses that some of the surplus will indeed be needed to serve the long-term needs of the southside communities. However, it appears that the surplus Norfolk water would be available in the short term and some may also be available in the long term and could serve at least some increment of the RRWSG's need when it arises. Corps authorization would be necessary for any pipelines or crossings affecting wetlands or waters of the United States. Generally, pipeline crossings do not result in major environmental impacts. Also, a portion of the pipeline could be attached to one of the bridges that cross the James River and involve less bottom disturbance. In a report dated 15 November 2000, the City of Newport News estimated that it would cost \$196.6 million to obtain surplus water from the City of Norfolk as compared to \$167.9 million to build the King William Reservoir.

11. Combined Adverse Environmental Impacts of the Project: While any one of the adverse environmental impacts alone may not lead me to a recommendation of denial, in combination, the adverse environmental impacts of the project, particularly the wetland loss and the adverse effects to an American Indian minority population, would be significant. The King William Reservoir would affect ecological processes both upstream and downstream of the dam and result in both short and long-term adverse effects on wetlands and wildlife habitats in Cohoke Creek and the Mattaponi River, which would lead to significant environmental degradation.

The reservoir would convert 1,526 acres of a highly diverse and productive system of wetlands, forests and streams and their wildlife communities into a monotypic, open-water lake environment favored by only a few lake-dependent species. Implementation of the proposed project would result in the loss of a generally undisturbed upland and wetland system (including 403 acres of vegetated wetlands and 34 acres of shallow open water), which provides high quality wildlife habitat as well as important water quality and flood control functions. The reservoir would flood a great blue heron rookery, numerous beaver ponds and large uninterrupted tracts of bottomland hardwood forests and would eliminate migration, feeding and breeding habitat for wetland dependent species. The reservoir would impound 21 miles of free-flowing stream and would reduce the downstream flow of Cohoke Creek to one third of its natural volume. The dam would block the future restoration of anadromous fish passage on Cohoke Creek. The project would result in the alteration and degradation of 186 acres of wetlands and their associated wildlife habitat downstream of the proposed dam on Cohoke Creek. The proposed outfall location would result in unnecessary degradation to aquatic resources including wetlands, fisheries and benthic populations in 0.8 miles of low energy streambed below the proposed discharge point on Beaverdam Creek. The conversion of forested wetlands to emergent and scrub-shrub wetlands along the pipeline route would result in a permanent conversion of forested wetlands and fragmentation of habitat for some interior forest species. Forest fragmentation decreases the habitat value of the remaining forest to many species.

Potentially adverse alterations to salinity gradients could affect the diverse tidal freshwater marshes in the nearly pristine Mattaponi River. The proposal would result in adverse impacts to two federally listed threatened plant species. A population of the federally listed threatened small whorled pogonia would be flooded within the reservoir pool area in Cohoke Creek. Also, the U. S. Fish and Wildlife Service concluded that potential cumulative impacts of the project from erosion and sedimentation, long-term changes in salinity, competition, loss of habitat, changes in water quality and introduced invasive species could result in detrimental effects on the sensitive joint-vetch populations on the Mattaponi River, especially to those colonies in the vicinity of the proposed intake structure.

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The project has the potential to result in ecological impacts to anadromous fish populations in the Mattaponi River. Without the availability of basic descriptive information on temporal and spatial distribution, spawning and early life history stages of American shad in the Mattaponi River, the potential for ecological impacts from the project on the species or its critical habitat cannot be accurately assessed. While the applicant's limited study did not conclude that there would be significant and detrimental impacts to migratory fish populations in the Mattaponi River as a direct result of the construction and operation of the King William Reservoir, the study did not consider the potential for indirect ecological effects as the result of physiochemical changes on fish assemblages. These same changes could also affect other species of fish, and other plants and wildlife in the Mattaponi River.

The project would adversely affect 115 archaeological sites (92 in the reservoir, 18 in the pipeline route and 5 at the pump station and in the intake pipeline route). Between 72 to 79 of these sites are considered potentially eligible for inclusion in the National Register of Historic Places. The reservoir would be located between Virginia's only two American Indian Reservations, and the proposed intake on the Mattaponi River would be constructed approximately three miles upstream of the Mattaponi Reservation. The project has the potential to impact a sacred site, traditional hunting, fishing, trapping, gathering and religious practices, subsistence fisheries, and the way of life of the Mattaponi, Pamunkey and Upper Mattaponi Indian Tribes. Development around the reservoir would further reduce the land available to the tribes for hunting, trapping and gathering and additional recreational boat traffic on the Mattaponi River would interfere with traditional net fishing. The Mattaponi and Pamunkey Tribes have a spiritual connection to the Rivers which is not only vital to their economy but is essential to their historical and cultural identity. The importance of the natural resources of Pamunkey Neck to the livelihood of Native Americans emphasizes the significance of the impacts. Therefore, the project has the potential to result in disproportionately high and adverse environmental effects to this minority population as described by Executive Order 12898.

The City of Newport News commented that the proposed water intake location at Scotland Landing is approximately 5.5 river miles upstream of the Mattaponi Reservation, not approximately 3 miles upstream of the Mattaponi Reservation as stated in the RROD. Both statements are true. The RROD correctly states that the water intake structure on the Mattaponi River would be constructed approximately 3 miles upstream of the Mattaponi Reservation (three miles away, in the upstream direction). The information provided by the RRWSG in the FEIS states on page 5-111, "...the Mattaponi Indian Reservation is approximately 3.5 miles south of the pump station." This is the linear distance between the two points. As indicated by Newport News, the intake site is also approximately 5.5 river miles upstream of the tribal reservation, as measured along the river channel, but this does not conflict with the statement in the RROD.

12. Extent and Permanence of Beneficial and Detrimental Effects:

a. Beneficial Effects: The regional cooperation between Newport News Waterworks and three other localities in the lower peninsula should reduce their competition for available supplies. The King William Reservoir would double the storage capacity of the current Newport News Waterworks system, would increase the Lower Peninsula's current treated water safe yield by one-third and would provide a second river basin as a new source of water, thereby decreasing effects from moderate droughts. The City of Newport News would benefit from the sale of water from the reservoir to their customers as well as to the other RRWSG members. The reservoir could provide 3 mgd of water to King William County and 1 mgd to New Kent County as hosts should these localities choose to build the necessary facilities to obtain

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the water. The reservoir would provide increased public recreational opportunities in the form of swimming, boating and year-round recreational fishing. The 1,526-acre reservoir would be stocked with forage and game species for freshwater recreational fishing. Also, camp sites, picnic areas and nature trails would be established around the perimeter of the reservoir. Hunting would also be allowed in the vicinity of the reservoir with certain restrictions. Lateral seepage from the reservoir could recharge the Yorktown aquifer and benefit local private wells; however, the exact effects on residential wells have not been investigated. King William County would benefit from the receipt of lease payments from the City of Newport News, and the generation of revenue from recreational, residential and light commercial development associated with the reservoir. The local area would benefit from additional temporary employment opportunities during the construction phase of the project.

b. Detrimental Effects: Construction and backflooding of the dam would result in the permanent loss of wetlands, upland forests and streams in the Cohoke Creek watershed and the water quality benefits and wildlife habitat they provide. Impoundment of the upper portion of Cohoke Creek would result in degradation of wetland and riparian communities downstream of the dam due to attenuation of stream flows. A sustained increase in stream flow conditions would result in degradation of aquatic habitat downstream of the outfall on Beaverdam Creek. The conversion of forested wetlands to emergent and scrub-shrub wetlands along the pipeline route would result in fragmentation of habitat for some interior forest species and decrease the habitat value of the remaining forest. Cultural and socioeconomic impacts to the Mattaponi, Pamunkey and Upper Mattaponi Tribes would be expected from both the reservoir and the intake on the Mattaponi River. Increases in residential and commercial development would permanently affect the relatively unspoiled rural nature of King William County and would affect the Mattaponi Tribe's ability to hunt, trap and gather resources for their subsistence and religious ceremonies. Adverse effects from physical and chemical changes associated with the Mattaponi River withdrawal could seriously affect the state's ability to restore the American shad population in the York River basin and adverse effects to the shad fishery in the Mattaponi River could have significant long-term effects on the society and economy of the Mattaponi Tribe. The proposed dam would permanently block the potential restoration of fish passage for anadromous species in Cohoke Creek. The project would result in adverse impacts to a colony of the federally listed threatened small whorled pogonia and possibly to populations of the federally listed threatened sensitive joint-vetch. Adverse impacts could occur to the federally listed threatened bald eagle if the recommendations of the U. S. Fish and Wildlife Service and the Virginia Department of Game and Inland Fisheries to prevent disruption during the critical nesting period are not implemented.

In their comments on the RROD, the City of Newport News indicated that they are not opposed to the recommendations for bald eagle management outlined in the EIS and the Biological Assessment and they had assumed that the management strategies would be incorporated as permit conditions. If I were to issue a permit for this project, these management strategies would be included as permit conditions. The City also indicated that they are not opposed to the recommendations outlined in the Biological Opinion for protection of the sensitive joint-vetch and assumed the recommendations would be incorporated as permit conditions. However, the applicant originally agreed to implement only three of the Service's six conservation recommendations. Furthermore, the City's most recent statement contradicts other statements made in response to the RROD regarding the flow-by requirements for the Mattaponi River. If I were to issue a permit for the proposed King William Reservoir, I would include all six of the Service's recommended measures as conditions of the permit.

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13. Probable Impacts in Relation to Cumulative Effects Created by Other Past, Present and Reasonably Foreseeable Activities: The Chesapeake Bay watershed and the Tidewater area have experienced intense development which has resulted in declining wetland resources and significantly reduced natural diversity. Between 1956 and 1977, before the Corps had jurisdiction over wetlands under Section 404 of the Clean Water Act, Virginia lost nine percent of its inland forested wetlands. Data from the U. S. Fish and Wildlife Service indicates that between 1982 and 1989, Virginia experienced a net loss of more than 18,000 acres of wetlands, most of which have occurred in the Coastal Plain (where the King William Reservoir would be located). According to the U. S. Fish and Wildlife Service, non-tidal forested wetlands such as those threatened by the King William Reservoir are the most rapidly disappearing wetland type in the Mid-Atlantic States. The need for further losses of this dwindling resource must be carefully weighed in the Corps' public interest review. Through the implementation of regulations and guidelines in the Corps' review process, significant wetland losses have been reduced and unnecessary losses have been avoided. The issuance of a permit for unjustified wetland losses of this magnitude would be contrary to the requirement to reduce cumulative impacts to these resources.

Approximately forty percent of the palustrine forested wetland losses were shown to be from reservoir and pond construction, which has resulted in a net gain in open water habitats. EPA believes that wetland losses from the proposed King William Reservoir would contribute significantly to ongoing cumulative adverse effects in the Chesapeake Bay, and that it is inappropriate to view these losses as offset by a gain in the open-water habitat of a man-made lake. According to the U.S. Fish and Wildlife Service, wetlands status and trends reports indicate that over 555,000 acres of ponds and reservoirs have been created in Virginia between 1956 and 1977, primarily at the expense of free-flowing rivers and streams. Therefore, populations of fish species dependent on riverine habitat in Virginia have suffered a decline in available habitat.

In their letter dated 25 February 2000, EPA stated that wetlands of the Chesapeake Bay, the nation's largest estuary, should be considered a high national priority and commented, "The KWR project may contribute substantially to ongoing cumulative adverse effect in the Chesapeake Bay watershed and southeastern Virginia where urban development has already significantly reduced the diversity of natural communities." The U.S. Fish and Wildlife Service believes that the two-thirds reduction in freshwater input to the Pamunkey River from Cohoke Creek should be considered as a cumulative effect to the York River system. The Virginia Department of Game and Inland Fisheries believes that a withdrawal of this proposed magnitude in concert with other withdrawals could alter nutrient dynamics in the York River system and change the composition of organisms above and below the withdrawal point.

Other than the allowances for New Kent and King William Counties from the reservoir storage as host localities, the water supply needs of other municipalities within the Mattaponi and Pamunkey River basins have not been considered or provided for by the RRWSG's regional plan. (The 3 mgd allowance for King William County and 1 mgd allowance for New Kent County are not included in the RRWSG's safe yield calculations.) King and Queen County and Caroline County in particular have expressed concern that the withdrawal of so much water from the Mattaponi River will preclude their being able to obtain future water supplies from the River when their needs arise. Instream flow conditions to preserve the quantity and quality of water for the maintenance of fish and wildlife resources could limit any additional future withdrawals.

The need for these and other municipalities to develop additional water supplies could lead to further cumulative wetland and habitat losses if other reservoirs are planned. For example, New Kent County's

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treated water deficit has been reported to be 9.1 mgd by 2040. After declining to cooperate further with the RRWSG toward a reservoir on Black Creek, New Kent County announced its plans to seek a separate permit for their own reservoir at Black Creek. If both the King William and Black Creek Reservoirs were constructed, the cumulative losses of these two projects would exceed 700 acres of wetlands, 35 miles of streams and 1,400 acres of upland habitat.

Also, the King William County Businessman's Association reported that King William County could not ever take advantage of the 3 mgd host allowance in the King William Reservoir storage because they could not afford the costs outlined in the agreement to buy the water; therefore, they will need another water source to solve their future deficit. However, James City County indicated that if Newport News had not resolved the permit issue by the summer of 2000, they would satisfy their 4.4 mgd deficit by developing a groundwater desalination plant, which should have little or no impact to wetlands. James City County's plans for a facility with up to a 6 mgd yield are currently going forward.

The King William Reservoir itself could result in additional cumulative impacts through future expansion of the reservoir footprint and enhancement of the raw water pumpover as described below:

a. Expansion of the King William Reservoir: In view of the concerns of the District and other federal and state agencies over the loss of wetlands and wildlife habitat, the RRWSG elected to submit a revised permit application for the KWR-IV alternative. However, they remained convinced that from the perspective of a long-term regional public water supply, their preferred KWR-II alternative would be technically superior. The 11 March 1997 Addendum Number 3 to the Development Agreement between the City of Newport News and King William County contains a clause reserving the wetlands between the KWR-IV and KWR-II dam sites for possible future downstream reservoir enlargement. If permitted, a future reservoir expansion would destroy an additional 137 to 216 acres of wetlands and their associated fish and aquatic resources downstream of the currently proposed KWR-IV dam site to supply between 2.2 to 3.9 mgd of additional treated water. Although the RRWSG offered to place temporary conservation easements over the wetlands and adjoining upland habitat between the proposed KWR-IV dam and upstream of the existing Cohoke Millpond as a part of their mitigation plan, they have not agreed to preserve these areas in perpetuity.

Therefore, it appears that the City of Newport News intends to eventually impact a total of 574 to 653 acres of wetlands for the King William Reservoir. These downstream wetlands closely resemble those in the proposed impoundment area and possess a high level of diversity. The dam site was moved upstream to KWR-IV for the FEIS, so not all of the impacts of a reservoir at the KWR-II or KWR-I locations have been fully evaluated. Such an expansion, no matter how probable, is not included in the RRWSG's current application.

b. Enhancement of the King William Reservoir: Also, an additional 45 to 120 mgd pumpover from the Pamunkey River to augment the Mattaponi River withdrawal as described in the EIS should be viewed as a "reasonably foreseeable withdrawal" when considering cumulative impacts to the York River system from salinity intrusion. The reduction in freshwater flows must be considered in light of cumulative impacts to the Chesapeake Bay. Although the City of Newport News stated that they had no immediate plans to pursue the second pumpover, and the impacts of such a proposal were not evaluated in the EIS, they clearly have not abandoned the potential for such an option. In the 8 August 1995 Addendum Number 2 to the King William Reservoir Project Development Agreement between the City of Newport News and King William County, a Pamunkey River pump station is included to provide a

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second pumpover to the proposed King William Reservoir as a way to enhance the safe yield of the reservoir and to supply water to jurisdictions other than those composing the group as of March 1995.

The dual pumpover of the enhanced King William Reservoir project would supply between 6 to 15 mgd of additional treated safe yield benefit for as yet unidentified users. According to VIMS researchers Dr. Carl Hershner and Dr. Al Kuo, any freshwater withdrawal from the Pamunkey River will affect the salinity in the York River and thus, the salinity in the Mattaponi River since these rivers are hydrologically connected. EPA expressed concern regarding the long-term cumulative impacts of the proposed withdrawals and potential withdrawals on both river systems as well as the York River system. EPA believes that the City's plans for an additional pumpover appears to be an attempt to piecemeal the project. There is no assurance that other localities would join the enhanced project since their future short and long-term needs may be met by other water supply technologies. During a December 1994 meeting, the District staff learned that none of the localities that the RRWSG had contacted were willing to commit to participation in an enhanced King William Reservoir project. The enhanced King William Reservoir project was never officially proposed to the District; therefore, it was not evaluated in the EIS and its environmental impacts and alternatives are unknown. In addition, the RRWSG has indicated verbally that in order to meet needs in the reasonably foreseeable future, they will likely request modification of their DEQ permit to allow a higher maximum daily withdrawal rate from the Mattaponi River, or to implement the less restrictive 40/20 Tennant minimum flowby method. This change would increase the potential for cumulative adverse impacts to resources in the Mattaponi River.

14. Adverse Environmental Effects Which Cannot be Avoided Should the Proposal be Implemented:

The proposed King William Reservoir would result in permanent wetland losses due to construction of the footprint of the dam and backflooding of the Cohoke Creek valley to establish an approximately 1,526-acre reservoir. The project would result in the direct and permanent loss of at least 21 miles of stream channel, 34 acres of open water habitat, 403 acres of non-tidal vegetated wetlands, and 1,089 acres of upland habitat. The project would result in the elimination of ecologically significant wetlands and floodplain that provide wildlife habitat, store storm flood waters and serve as a water quality buffer. A large, diverse complex of wetland and upland habitats that support a wide array of aquatic, semi-aquatic and terrestrial wildlife would be transformed into a monotypic lake environment favored by only a few species. While the applicant's mitigation plan could provide 2 to 1 replacement of wetlands, it would not achieve in-kind functional compensation.

Restriction of flows from construction of the proposed dam also would alter the sustaining hydrologic regime and associated biological, geological and chemical processes of the existing non-tidal wetlands downstream of the proposed reservoir site. This would indirectly and permanently alter 186 acres of downstream wetlands and the habitat they provide for wetland dependent species. The presence of a 78-foot high dam would permanently preclude the potential restoration of fish passage for anadromous species upstream of that point in Cohoke Creek. The reservoir would flood a great blue heron rookery and the construction and operation of the outfall on Beaverdam Creek could adversely impact the nesting success of another four-nest heron rookery.

Additionally, construction of pipelines to connect the new reservoir to the existing Newport News Waterworks distribution system and to provide for the proposed pumpover from the Mattaponi River would result in the permanent conversion of 10.4 acres of forested wetlands to emergent and/or scrub-shrub wetland cover types. The construction of a concrete and riprap outfall structure and the excavation of a 150-foot discharge channel on Beaverdam Creek would permanently destroy approximately 0.15

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acres of vegetated wetlands. The sustained increase in average stream flow conditions of post project discharge flows would permanently degrade the stream dynamics and morphology by increasing erosion rates and adversely affect downstream wetlands, fisheries and benthic populations. Most, if not all, of these effects could be avoided by moving the outfall another 0.8 miles downstream to Diascund Reservoir.

A population of the small whorled pogonia, approximately 92 archaeological sites, and potentially a site of sacred significance to Native Americans in the Pamunkey Neck region would be permanently flooded by the reservoir. An additional 23 archaeological sites would be impacted by the intake and pipelines. The project has the potential to adversely affect the already depleted shad population in the Mattaponi River and to have indirect adverse effects on colonies of the sensitive joint-vetch located near the intake site. The project would result in permanent adverse effects to the way of life of Native American tribes by affecting their continued ability to obtain food and resources from the Mattaponi River and the Pamunkey Neck area.

15. The Relationship Between Short-Term Uses of Man's Environment and the Maintenance and Enhancement of Long-Term Productivity: While the proposed reservoir and river pumpover would meet or exceed the applicant's projected water supply needs, the combined impacts of the project would result in a significant and adverse decrease in the long-term productivity of the estuarine system. The proposed King William Reservoir project would adversely affect ecological processes both upstream and downstream of the dam and have both short-term and long-term effects on wildlife habitat. A dramatic alteration in patterns of sediment transport and nutrient exchange, which are vital to downstream ecosystems, would be expected from the impoundment.

A highly diverse and productive natural stream valley system of wetlands, streams and forests would be replaced with a man-made lake of low diversity and relatively low productivity. The aquatic environment of a man-made lake may provide a productive habitat for a few lake-dependent species, but literature has shown that their productivity and diversity usually decline over time. Furthermore, lakes that are managed for water supply are subject to frequent and sometimes very large drawdowns which further degrade the aquatic habitat provided by the lake environment. Although the King William Reservoir would provide a large freshwater fishery, it cannot be expected to possess the same functions and values as the highly diverse Cohoke Creek valley ecosystem.

16. Any Irreversible or Irrecoverable Commitments of Resources Which Would be Involved in the Proposal Should it be Implemented: There would be an irretrievable loss of the upper portion of an intact and functional ecosystem in the Cohoke Creek watershed. Irreversible effects to ecological processes both upstream and downstream of the proposed dam would result from the permanent and significant alteration of the flow pattern of Cohoke Creek. As proposed, the project would result in the elimination of 403 acres of vegetated wetlands and 34 acres of shallow open water and the wildlife habitat they provide as well as the displacement and/or destruction of their inhabitants, the inundation of approximately 21 miles of free-flowing streams and the reduction of the average flows to the Pamunkey River. The net reduction in freshwater discharge below the dam would restrict stream flows to about one third of the existing average flow and would result in adverse impacts to the wetland vegetation and the fish and wildlife that Cohoke Creek and Cohoke Millpond support. Wetland, upland and riparian habitat that provides food, cover and reproductive sites for the vast majority of species in the watershed would be irreversibly lost.

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Approximately 10.4 acres of forested wetlands would be permanently converted to emergent and scrub-shrub wetlands for stream/wetland crossings along the pipeline route. Although the affected area would still be vegetated wetlands, a change in cover type due to clearing and continued maintenance of the utility corridor would result in a net loss of forested wetland function.

The outfall structure on Beaverdam Creek would permanently destroy approximately 0.15 acres of vegetated wetlands and the operation of the pumpover with an average 7-fold increase above existing flow conditions in Beaverdam Creek would adversely and permanently change stream dynamics. Changes in stream morphology would result and this low energy system would experience degradation due to sustained increases in flow volumes and velocities. Increasing the average stream flow condition from 4.5 mgd to 32.6 mgd would generate unacceptable levels of sustained flow volume on downstream stream aquatic resources, including vegetated wetlands, fisheries and benthic populations. Sustained flow volumes would increase rates of erosion and subsequent deposition of erodible materials (including highly erodible materials such as organics and silts), and will potentially decrease water quality downstream to Diascund Creek Reservoir.

The Native American archaeological sites and possibly a sacred site that would be permanently flooded would represent an irretrievable cultural and spiritual loss to the Mattaponi, Pamunkey and Upper Mattaponi Tribes. The loss of traditional tribal hunting, trapping and gathering grounds within Pamunkey Neck would permanently and irreversibly affect the Mattaponi Tribe's ability to obtain food and other raw materials important to their culture and survival. Any adverse effects to the already depleted shad population in the Mattaponi River would be expected to affect the Mattaponi Tribe's shad hatchery and subsistence fishery. Such impacts would have a permanent effect on the tribe's historical uses of the land and the river.

The irreversible loss of the wetland and upland forested areas within the reservoir pool area would result in a permanent decrease in silvicultural activities, the permanent loss of a colony of the small whorled pogonia as well as the permanent displacement of a great blue heron rookery. The indirect adverse effects on populations of the sensitive joint-vetch in the Mattaponi River would be expected to be permanent as long as the intake remains in the river and is operational.

The District has developed monitoring protocols for the Mattaponi River and Cohoke Creek downstream of the dam which are intended to detect potential changes and to allow for a reevaluation of permit conditions to address adverse effects. However, it may not be possible to rectify some of the adverse effects, and some changes may not be detectable until the damage has occurred.

17. Comments and Recommendations of the Corps Federal Advisory Agencies: The King William Reservoir has remained controversial with the federal advisory agencies due to its associated adverse environmental impacts, especially the loss of extensive wetlands and wildlife habitat. There has been a high degree of agency cooperation to solve problems and develop solutions in the review of this application and full consideration of agency concerns in the District's decision-making process. Only comments received in response to the FEIS or later are included in this section. Where appropriate, earlier comments have been incorporated into other sections of this document.

a. U. S. Fish and Wildlife Service: In their letter of 25 July 1997 in response to the FEIS, the U.S. Fish and Wildlife Service recommended denial of the proposed King William Reservoir due to the project's impacts on 437 acres wetlands/shallow open water habitat, 21 miles of perennial and

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intermittent streams, 875 acres of forested wildlife habitat (not including 214 acres of early successional forest), alteration of 105 acres (later revised to 186 acres) of downstream wetlands, elevating salinity levels in the York River basin and impacting the federally listed threatened sensitive joint-vetch. The Service stated that these impacts are extremely detrimental to the fish and wildlife resources of Southeast Virginia and will result in substantial and unacceptable impacts to Aquatic Resources of National Importance (ARNI).

The Service expressed continued serious concerns over the integrity of the Mattaponi ecosystem following withdrawals for the King William Reservoir. They expressed concern for alteration of salinity gradients, and effects to the Mattaponi River's diverse tidal freshwater marshes, including the federally listed threatened sensitive joint-vetch. The Service stated "Based on the Service's extensive involvement evaluating the evolving wetland mitigation plan, we do not see the possibility that the applicant can adequately replace the wetland functions, contiguous habitat, and wetland types that the project proposed to impact." They clarified that their involvement did not equate to endorsement of the mitigation plan or of the project.

The Service also expressed concern that the project would impact all or a portion of the wetlands downstream of the proposed dam due to the inappropriate flow regime proposed for reservoir releases which does not mimic natural flows. The Service continued to recommend that the pipeline to Diascund Reservoir be extended the entire length to avoid adverse impacts to Beaverdam Creek from irregularly high, potentially erosive flows. The Service requested an opportunity to review Dr. Garman's report in its original version before Newport News's editorial changes. The Service believes that the information on Mattaponi River fish communities is insufficient and that the applicant should be required to do further sampling to help tailor the River Monitoring Plan. The Service recommended 1 mm wedgewire screens on the intake with intake velocities not to exceed 0.25 feet per second. As mitigation for the reduction in anadromous fish habitat in Cohoke Creek, the Service recommended providing fish passage at a suitable location on another stream as a condition of the permit, if granted. The Service concurred with the Department of Game and Inland Fisheries concerning time of year restrictions for the great blue heron rookery and commented that the buffer recommendations around the reservoir proposed for bald eagles by the Service and the VDGIF should serve to compensate for inundation of the existing heron rookery. The Service commented that river salinity changes may profoundly affect the sensitive joint-vetch and that laboratory germination results may not duplicate conditions of a natural setting. The Service commented on the RRWSG's proposed management conditions for the bald eagle and recommended that the Service and the VDGIF be consulted for recreation and nature trail plans.

In a letter dated 22 July 1999, the U.S. Fish and Wildlife Service provided comments on the RRWSG's final wetland mitigation plan. The Service stated that the proposed mitigation plan is hydrologically and ecologically out-of-kind, separates the stream mitigation from the wetland mitigation and does not compensate for the loss of the Cohoke Creek stream valley wetland complex. The Service stated that "the stream valley wetland complex has been torn into two disjunct, ecologically disconnected components for mitigation purposes." The Service stated "...the mitigation proposed is significantly out-of-kind, and does not compensate for the loss of the Cohoke Mill Creek stream valley wetland complex." and "We have yet to understand how a stream valley wetland complex driven by a groundwater/surface water interface can be recreated." The Service does not believe that the final plan adequately addresses monitoring of the mitigation sites nor does it make a commitment to long-term hydrology rights from off-site sources for certain farm fields.

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The Service believes that the RRWSG's proposed downstream releases do not avoid impacts to the functioning of wetlands downstream of the dam site. In their 22 July 1999 letter, the Service concurred with my preliminary position that there is a lack of demonstrated need to destroy 403 acres of wetlands and my concern for the combined adverse environmental impact that would result from the King William Reservoir and Mattaponi River intake. They also reiterated their recommendation that the Department of the Army permit be denied. The Service stated "These wetland systems are not a readily replaceable, mitigatable resource." ...and..."The best compensation package in the world is not appropriate if avoidance of the wetland impact is a practicable option." Finally, the Service commented "Because of our overriding concern that the King William Reservoir has not been proven to be the least damaging practicable alternative, the Service believes that a very detailed examination of the applicant's Final (wetland mitigation) Plan is not warranted at this time."

Comments Received on the RROD from the U. S. Fish and Wildlife Service: In a letter dated 1 May 2001 commenting on the District's Recommended Record of Decision, the U. S. Fish and Wildlife Service stated their belief that "...the Norfolk District (District) did a highly commendable job compiling, evaluating, and interpreting the very complex and abundant technical materials developed and submitted on the proposed project to produce the Recommended ROD. The public interest review was well served by your conscientious efforts at an open and inclusive administrative process to comply with the letter and intent of the National Environmental Policy Act (NEPA). Only through this thorough examination did a number of relevant impacts and issues come to light, which were crucial to making an informed decision on the permit application."

The Service stated their continued belief that "...Cohoke Mill Creek and the Mattaponi and Pamunkey Rivers are aquatic resources of national importance, pursuant to the Clean Water Act, section 404(q) Memorandum of Agreement with the Department of the Army. The Service is very concerned about the proposed project's damaging impacts to the environment, which include, but are not limited to:

1. Fill and inundation of 437 acres of a complex mosaic of stream valley wetlands (403 acres of palustrine-forested scrub-shrub and emergent wetlands, and 34 acres of shallow open water);
2. Elimination of 21 miles of free-flowing intermittent and perennial streams;
3. Hydrologic and functional alteration, and potential future inundation, of an additional 186 acres of contiguous wetlands downstream of the dam;
4. Potential harm to colonies of the federally threatened plant, sensitive joint-vetch (*Aeschynomene virginica*), on the Mattaponi and Pamunkey rivers;
5. Potential functional alteration of the valuable tidal freshwater zones of the Mattaponi and Pamunkey rivers;
6. Loss of habitat and impacts to the federally threatened plant, small whorled pogonia (*Isotria medeoloides*), within the reservoir;
7. Loss of 761 acres of riparian habitat, including mature cove forest, to reservoir inundation;
8. Disruptions to migratory bird nesting, including great blue herons nesting in the reservoir pool area and bald eagles, potentially near the pipelines or mitigation sites; and,
9. Stream channel and palustrine forested wetland erosion and destabilization in Beaverdam Creek, used as an inter-reservoir conveyance channel."

The Service concluded "After an examination of the evidence clearly presented in the Recommended ROD, we share your belief that the proposed project would cause or contribute to significant degradation of waters of the United States, including wetlands. We also concur that these damaging environmental

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impacts are avoidable by selecting other water supply options available to the applicant. Therefore, the Service strongly supports your recommended decision to deny the permit application.”

b. U. S. Environmental Protection Agency: In their letter of 25 July 1997 commenting on the FEIS, EPA stated that despite the avoidance of 216 acres of wetlands with the KWR-IV configuration, and the RRWSG’s good faith effort to resolve difficult issues, major outstanding environmental and cultural issues remained. EPA recommended the publication of a Supplement to the FEIS in order to provide full public disclosure on the project’s effects on environmental justice, the presence or absence of Traditional Cultural Properties, address unresolved questions regarding salinity impacts to the flora and fauna of the Mattaponi River, and to incorporate the results of the Habitat Evaluation Procedures into the applicant’s wetland mitigation plan.

EPA commented that the impacts related to the loss of 437 acres of diverse and valuable wetlands/shallow open water habitat within the Cohoke Creek basin would be significant. The wetlands provide multiple ecological functions ranging from water quality enhancement to wildlife migration, feeding and breeding habitat. These functions and the uniqueness/heritage values of these wetland ecosystems would be lost for many wetland dependent wildlife species and would not be sufficiently replaced by the open-water habitat of a 1,526-acre lake. EPA believes that the wetlands at the project site qualify as an Aquatic Resource of National Importance (ARNI) due to their diverse type, quantity and functional capacity. EPA also expressed concern that the downstream releases into Cohoke Creek did not mimic natural pre-project flows and that wetlands impacted by the pipeline construction were not addressed in enough detail in the FEIS.

EPA commented that the water deficit projections for the industrial sector appear to be too high, which apparently reflects insufficient movement towards reuse or recycling in new or existing industry. They recommended more progressive conservation strategies such as inclining block rates, aggressive reuse of non-potable water by industry and aggressive community outreach to promote water conservation.

EPA concurred with the District, the Virginia Department of Historic Resources and the Advisory Council on Historic Preservation that Traditional Cultural Properties of importance to the Mattaponi and Pamunkey Indian Tribes were likely to exist in the vicinity of the project and commented that this information would provide useful in the environmental justice analysis. EPA noted that although the Tribes’ spiritual and cultural sense might be difficult for non-natives to grasp, the environmental justice analysis requires that they be taken seriously. EPA also commented that the impacts to treaty-protected resources and the Tribes’ historical, cultural and spiritual interest in the artifacts that contain the archaeological record of the Tribes’ history should not be overlooked in the environmental justice analysis.

In a letter dated 28 May 1998, EPA commented “The wetlands of the Cohoke Creek Watershed have been shown to be of high structural complexity and ecological value. These wetlands interspersed among uplands create a unique ecosystem complex with unique functions and values. Further, available literature on mitigation of palustrine forested and scrub-shrub wetlands indicates that these types are among the most difficult to replace.” and “Site selection has targeted prior converted croplands as a means of restoring wetland functions. Although this approach has merit, these areas generally will not support wetter hydrologic regimes (e.g. PFO1E) such as those found throughout the Cohoke Mill Creek watershed.”

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In a letter dated August 18, 1998, EPA indicated that they would not be able to agree to issuance of a Section 404 permit until a superior, in-kind wetland mitigation plan is developed and again recommended the publication of a Supplement to the FEIS to include the final wetland mitigation plan as well as information the District had gathered since publication of the FEIS on project need, Traditional Cultural Properties, and environmental justice.

In a letter dated 5 August 1999, EPA wrote to inform the District that based on the Institute for Water Resources assessment of the project's purpose and need, EPA believed that the King William Reservoir may not represent the least damaging practicable alternative to water supply deficits in the Lower Peninsula. They stated that the applicant's final wetland mitigation plan (May 1999) has not fully prescribed to the mitigation sequencing which stresses avoidance of adverse impacts as the first step in mitigation planning.

In this letter, EPA maintained their position that due to the diverse type, quantity and functional capacity of the wetlands at the project site, they would qualify as an Aquatic Resource of National Importance (ARNI) in accordance with Part IV 3(a) of the Clean Water Act Section 404(q) MOA between EPA and the DOA. Because the diverse wetland communities at the site have been shown to have high structural complexity and ecological value, EPA believes it may be extremely difficult, if not impossible, to adequately replace them and that there is an ecological risk associated with compensatory mitigation. Therefore, EPA believes that a more rigorous monitoring schedule than proposed in the applicant's May 1999 plan should be incorporated in the Corps permit, if one is issued.

In a letter dated 25 February 2000, EPA stated "The context of the project; the Mid-Atlantic Region, Chesapeake Bay Watershed, tidewater Virginia, are all areas experiencing intense development pressure and declining wetland resources, the intensity of the impacts (KWR represents the largest permitted loss of wetland in the mid-Atlantic region) and uniqueness of the region from an ecological and cultural perspective, combine to make this project one of the most significant projects Region III has ever worked on." (The mid-Atlantic region consists of Pennsylvania, Maryland, Delaware, Virginia and West Virginia.) "The importance of these natural resources to the Native American tribes in the area and the public at large makes the impacts related to the KWR project take on a larger significance. These impacts cannot be considered insignificant, even with the mitigation measure in place and fully functioning."

Comments Received on the RROD from the U. S. Environmental Protection Agency: In a letter dated 1 May 2001, commenting on the District's Recommended Record of Decision, the U.S. Environmental Protection Agency stated "EPA recognizes the need to supply dependable sources of water to communities and we compliment the applicant, the RRWSG, on their efforts to try to minimize their project's impacts on the environment. However, we agree with the Norfolk District in their Recommended ROD that the permit should be denied. We believe that the substantial impacts to wetlands and other important natural resources are avoidable because there are options available to the RRWSG members to reduce water demand and optimize existing sources of water. Although these options may not be the first choice of the RRWSG we believe that, in light of the significance of environmental impact associated with the KWR IV, these steps are not only prudent, but clearly represent the least damaging practicable alternative to offset future water demands."

EPA further commented "If permitted, the project would have represented the largest wetland loss in the Mid-Atlantic region in the history of the Clean Water Act Section 404 program and would deal a serious blow to efforts to restore and enhance the existing wetland base within the Commonwealth of Virginia

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and the Chesapeake Bay Watershed. In light of commitments made by the Federal government and the Governors of Virginia, Maryland and Pennsylvania in the Chesapeake 2000 Agreement to restore and maintain the wetland resources of the Chesapeake Bay, losses of this magnitude should not be authorized unless they clearly are unavoidable. Wetland protection is integral to the goals of the Chesapeake 2000 Agreement which not only focus on wetland restoration but also clearly seek to reduce wetland loss through the regulatory program. We believe that the Corps of Engineers has viewed this project in a similar manner and that the intense scrutiny of project impacts is warranted based on the magnitude and complexity of adverse affects, not only to valuable wetland resources but to the ecology of the region as a whole.”

Concerning water need, EPA commented “EPA believes that the Corps’ independent evaluation of purpose and need was an appropriate response to the comments raised and was warranted due to the significance of the project impacts”...and...”We continue to defer to IWR’s judgement in this case and accept their October 2000 report as appropriate information for decision-making on the KWR IV permit application.”

EPA stated “EPA agrees with the Corps’ Section 404(b)(1) analysis as stated in the Recommended ROD. We agree that the King William Reservoir IV project would cause or contribute to significant degradation of waters of the United States, including wetlands, specifically in Cohoke Mill Creek and the Mattaponi River as described under the 404(b)(1) Guidelines at 40 CFR 230.10(e.). EPA believes that the adverse impacts associated with construction of the KWR IV are significant and avoidable. We concur that the individual and cumulative damages to the wetland resource outweigh the benefits of the proposed filling to the applicant. We also agree with the Corps that the KWR IV project does not represent the least damaging practicable alternative because less environmentally damaging options exist to meet future water demands in the region”...and...”EPA continues to believe that wetlands of Cohoke Mill Creek would qualify as Aquatic Resources of National Importance (ARNI), as described under the 404(q) Memorandum of Agreement between EPA and the Department of the Army. Furthermore, we believe the FEIS and other supporting documentation clearly indicate that construction of the KWR IV project could have an unacceptable adverse effect on wildlife and fishery areas as described under Section 404(c) of the Clean Water Act.”

EPA stated that they do not agree with the RRWSG’s assessment that the wetlands of Cohoke Mill Creek watershed are not valuable or highly diverse. EPA stated their opinion that “These statements by the city of Newport News and their consultants (after the publication of the FEIS) are clearly biased and are not supported by any data gathered or evaluated by the EPA. Newport News’ arguments that the wetlands of Cohoke Mill Creek are not unique or their loss is insignificant because they only comprise four percent of the total estimated non-tidal palustrine wetlands in King William County is not supported by the data. The information collected during the NEPA process and included in the FEIS clearly shows that these wetlands, interspersed among each other and among some very significant upland habitat, are of high quality and are structurally complex thereby providing multiple ecological functions to the watershed.”

EPA further stated “Large, intact watersheds with this level of community diversity and interspersed are increasingly rare (particularly in developing areas) and will become more so over time. Given that the King William Reservoir will effectively eliminate the bulk of the watershed in one single action exemplifies the magnitude of the impact. The Corps observes that the 437 acres of wetland and shallow water losses incurred by permitting the King William Reservoir exceed the annual permitted wetland loss for the entire state of Virginia. In this instance the KWR IV project is unique. It would more than double

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the wetland losses through the regulatory program in the state for a year and concentrate the losses in one watershed.”

Concerning the RRWSG’s proposed mitigation plan, EPA stated “We agree with the Corps that the mitigation measures will not compensate for all losses in wetland functions, values or specific habitat losses. The proposed mitigation package cannot replicate the size, location, interspersions, and landscape context functions inherent in an intact watershed. The FEIS clearly establishes a profound alteration of a diverse and complex lotic wetland/aquatic system to a less diverse lentic system designed to provide municipal water via pump storage. EPA agrees with the Corps that the resultant lake would be of less ecological value than the existing wetland complexes despite the reservoir’s size. Reservoirs managed for water supply are even less likely to provide fully functioning fishery habitats due to periodic drawdowns. The KWR IV could experience significant drawdowns of up to twenty feet, further reducing habitat suitability. Additional information reveals that the KWR IV will accommodate a certain level of peripheral residential, commercial and light industrial development. Secondary development around the lake will further reduce its ability to support habitat. We believe the intrinsic value of the intact ecosystem at Cohoke Mill Creek could never be offset by the open water habitat of the King William Reservoir IV.”

Regarding cultural resources and environmental justice, EPA stated “EPA agrees with the Corps’ analysis that construction of the KWR IV project would significantly and adversely affect the Mattaponi, Pamunkey and Upper Mattaponi Tribes and that these impacts could not be adequately mitigated. Although these impacts have been difficult to quantify, EPA believes (with the Corps), that these impacts are real, especially and particularly to the Native Americans in the Pamunkey Neck. EPA believes that the importance of these natural resources to the Native American tribes in the area makes the impacts related to the KWR IV project take on a larger significance. EPA agrees with the Corps that the impacts to Traditional Cultural Properties and the cultural and spiritual integrity of the Tribes are unacceptable because they are avoidable. EPA believes the Corps acted appropriately in their review of cultural impacts associated with the KWR IV project. In their analysis of environmental justice and social and cultural issues, the Corps has attempted to preserve important historic, cultural, and natural aspects of our national heritage as required by the mandates of the National Environmental Policy Act.”

Regarding the District’s public interest review, EPA commented “The Council On Environmental Quality’s implementing regulations for the National Environmental Policy Act state, “NEPA procedures must insure that environmental information is available to public officials and citizens before decisions are made and before actions are taken. The information must be of high quality. Accurate scientific analysis, expert agency comments, and public scrutiny are essential to implementing NEPA. Most important, NEPA documents must concentrate on the issues that are truly significant to the action in question, rather than amassing needless detail.” Notwithstanding unresolved issues regarding preparation of a supplement to the FEIS, EPA believes the Norfolk District Corps of Engineers took their responsibilities under NEPA seriously by seeking high quality and accurate information to be used in their decision-making process. They sought and considered expert agency opinion and review from not only the federal resources agencies, including EPA, but also from the Commonwealth’s agencies as well. This consultation resulted in development of an interdisciplinary approach which gave consideration to important issues. EPA believes that it was appropriate under NEPA for the Norfolk District to independently evaluate complicated and contentious issues. These issues included evaluation of the salinity model used to determine impacts of the freshwater withdrawals from the Mattaponi River, evaluation of Traditional Cultural Properties by qualified ethnographers, evaluation of impacts to shad fisheries as a result of Mattaponi withdrawals, and analysis of water demand projections.”

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EPA expressed their concurrence with the District's findings in the RROD as follows: "In conclusion, EPA reiterates our support of the Norfolk District Corps of Engineers' decision to deny a Section 404 permit for construction of the King William Reservoir. EPA bases its position on the body of evidence included in the NEPA process for the KWR IV. The application of the NEPA process and the data collected have provided the necessary information to assess and evaluate the impacts associated with construction of the KWR IV, a large reservoir development in the coastal plain of Virginia. The analysis clearly states that the impacts would cause or contribute to significant degradation of waters of the United States, including wetlands, specifically in Cohoke Mill Creek and the Mattaponi River as described under the 404(b)(1) Guidelines at 40 CFR 230.10 (e). EPA agrees with the Corps' assessment that impacts associated with the proposed KWR IV are avoidable. As such, the KWR IV project does not represent the least damaging practicable alternative. We agree with the Corps that a permit cannot be issued for the project because the project does not comply with the Section 404(b)(1) Guidelines. EPA believes that wetlands of Cohoke Mill Creek would qualify as Aquatic Resources of National Importance (ARNI) as described under the 404(q) Memorandum of Agreement between EPA and the Department of the Army. We believe that construction of the KWR IV project could have an unacceptable adverse effect on wildlife and fishery areas as described under Section 404(c) of the Clean Water Act."

Finally, EPA commented "Should circumstances warrant a change in the permit decision for the KWR IV, EPA reserves the right to provide additional comment on unresolved impacts and conditions of the permit. EPA also continues to reserve its authority pursuant to the Clean Water Act, Section 404(c). We appreciate the opportunity to review the Recommended ROD. Once again, we commend the Corps for their diligent efforts in information gathering and commitment to the spirit and intent of NEPA."

c. National Marine Fisheries Service: The National Marine Fisheries (NMFS) submitted comments dated 12 March 1996 in response to the Supplement to the Draft EIS. No comments were received from NMFS on the Final EIS. The NMFS commented that because anadromous and semi-anadromous fish populations in the Mattaponi, Pamunkey, and Cohoke Creek drainages are currently low, significant impacts to these species are not tolerable. They commented that strict intake protection from impingement and entrainment of eggs and larvae is critical. Therefore, they maintained their support for the use of 1.0 mm wedge wire screens with intake velocities not to exceed 0.25 fps. The NMFS expressed concern that the proposed 3 mgd releases from the King William Reservoir would reduce the Cohoke Creek streamflow to one-third of the average streamflow and there may not be sufficient water to maintain acceptable fish habitat downstream of the dam. They also questioned the RRWSG's claim that the proposed discharge into Beaverdam Creek would be beneficial to aquatic organisms. The NMFS commented that the introduction of regular high flow events in the Creek would change the species composition structure over the long term. They also expressed concern that stream channel erosion could be significant, even if the released high flows stay within their banks. Their site inspection revealed that the streambed of Beaverdam Creek contains soft fine substrate material which could be readily eroded by high water events. Therefore, they recommended moving the outfall to Diascund Reservoir.

d. U. S. Geological Survey: In a letter dated 3 May 2001, the U.S. Geological Survey referenced a recently released report entitled "Water-The Potential Consequences of Climate Variability and Change" (Gleick and others, 2000) which recommends that water managers consider climate change through the use of a general circulation model to simulate regional patterns when making decisions. Two models were cited that produced quite different results on annual precipitation and runoff. According to the U.S. Geological Survey, the Gleick report recognizes the considerable uncertainty inherent in using

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such models for long-term hydrologic forecasting, but it includes information that may be relevant in evaluating the full range of factors influencing future water supplies and the environment in southeastern Virginia. This report is addressed in Section 7 of the Final RROD – Extent of Public and Private Need.

18. Views of Other Federal and State Agencies and Representatives and Local Government Officials:

a. Virginia Department of Environmental Quality (DEQ): The Virginia DEQ issued its Virginia Water Protection Permit/401 Certificate on 22 December 1997. The permit imposed a more restrictive minimum instream flow for the Mattaponi River than the one the RRWSG proposed, set a higher minimum downstream release from the dam into Cohoke Creek and placed maximum limits on interbasin transfers from the King William Reservoir to the other Newport News reservoirs. These conditions were imposed to ensure that the proposed activity would be consistent with the provisions of the Clean Water Act and protect instream beneficial uses. DEQ's decision to impose these conditions was based, at least in part, on the state's determination that the applicant's need would be up to 13 mgd less than the RRWSG projected. Among the factors that contributed to this figure are: high unaccounted-for water losses, continued availability of the Big Bethel Reservoir, low estimation of groundwater supplies in James City County and questionable calculation of available supply as dead storage in the various reservoirs in the Newport News system. DEQ stated in their comments on Supplement to the Draft EIS, "The 30.2 mgd demand deficit is the product of numerous assumptions, nearly all of them favoring the construction of the largest project." Nevertheless, DEQ urged me to support the King William Reservoir in my Record of Decision.

In an internal memorandum dated 20 February 1997, DEQ indicated that they proposed stricter withdrawal and transfer conditions for their VWP because they were concerned that Newport News would over-rely on the Mattaponi River when existing sources would prove adequate. DEQ remarked that such conditions were standard in other VWP water supply permits and would prevent Newport News from using Mattaponi River/King William Reservoir water for purposes other than those stated in their application. DEQ's memo went on to state that minimizing long-term transfers from the Mattaponi River would minimize salinity changes and preserve water for future users. Without these long term limits, DEQ believed that surplus Mattaponi/King William Reservoir water could potentially be sold to other localities or used to provide water to other pumped storage projects. DEQ cited the following sections of state law as their authority to impose conditions to regulate minimum instream flow and volumes of water withdrawn: Section 62.1-11 states: (a) Such waters are a natural resource which should be regulated by the Commonwealth. (c) "The waste or unreasonable use or method of use should be prevented" (e) The right to the use of water or to the flow of water in or from any natural stream, lake or other water course is and shall be limited to such water as may be reasonably be required for the beneficial use of the public to be served; such right shall not extend to the waste or unreasonable method of the use of such water; and Section 62.1-44.15:5 states: (b) Conditions contained in a Virginia Water Protection Permit may include, but are not limited to, volumes of water to be withdrawn.

Newport News claimed that the DEQ permit was unfairly restrictive, reducing by as much a one-third the amount of water they could withdraw from the Mattaponi River. They stated that DEQ's required Minimum Instream Flow and other conditions of the permit would "cripple the project." Although the City filed suit against DEQ to have these restrictions removed, they did not appeal the court decision that upheld the DEQ permit.

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In a letter dated 23 July 1999, DEQ wrote to the District disagreeing with the conclusions of the Draft IWR report on the water needs of the lower peninsula using almost the exact wording found in Newport News' 16 July 1999 "Lower Peninsula Water Needs: A Summary Response and Rebuttal to Institute for Water Resources 'Special Study' May 1999."

Comments Received on the RROD from the Virginia Department of Environmental Quality: In a letter dated 2 May 2001, DEQ Director, Dennis Treacy indicated that although Governor Gilmore's letter expresses the Commonwealth's position of support for the King William Reservoir, DEQ's letter is to transmit more technical comments, focusing on the validity of some key technical arguments in the RROD.

Mr. Treacy disagrees with the RROD's implication that Newport News can realize large increases in safe yield simply by reallocating dead storage to water supply storage. He said that the safe yield analysis overestimates the amount of water that can be pumped from the Chickahominy River and overestimates runoff to the existing reservoirs from their respective watersheds, both of which tend to keep the reservoirs full and the critical drought periods short in the model. He admits that there is some potential gain that could be realized by reallocating dead storage, but it is not nearly as large as the RROD claims. He stated that the RROD does not consider the environmental and economic costs or the public health risk in decreasing dead storage. He said that modeling errors lead to erroneous estimates of the frequency of mandatory conservation. This issue is addressed in Section 7 of the Final RROD – Extent of Public and Private Need.

Mr. Treacy disagrees with the statement in the RROD that the proposed James City County desalination plant would result in a gain of 4 to 6 mgd. This issue is addressed in Section 7 of the Final RROD – Extent of Public and Private Need.

Mr. Treacy stated that it is an oversimplification to describe the state's decision making as a first come, first served process. He stated the reasons why Caroline County and King and Queen County would not be precluded from withdrawing water from the Mattaponi River. Mr. Treacy stated that a municipal water withdrawal that would return water largely undiminished in quantity, would not be given the same minimum instream flowby conditions as an interbasin transfer. He also stated that if a municipal withdrawal is appropriately sized with respect to the size of the stream, it frequently receives only a limit on the maximum withdrawal. This further clarification has been added to Section 8 a. - Water Supply in the Final RROD. However, I still believe that without a regional cooperation agreement, it is possible that not all of the needs in a locality will be met by the resources available in that vicinity if they have already been allocated to a previous user. A plan to protect instream resources in the region similar to the Regional Flow Management Plan developed by the City of Richmond and Henrico County for competing uses of the James River might be necessary.

Mr. Treacy indicated that agricultural riparian water rights would unlikely be threatened as stated in the RROD. He said that modeling indicates essentially unmeasurable changes to salinity, so water quality would not be significantly affected. Also, due to minimum instream flow conditions on the King William Reservoir intake, withdrawal would not occur during the time of maximum water use by farmers. While water withdrawal may be far less than the maximum authorized much of the time, it is likely that Newport News would withdraw water during summer months as authorized by their VWPP. Furthermore, the amount withdrawn may reduce the remaining instream flow to its lowest allowed level during the same periods when potential agricultural withdrawals are at their highest levels. As the gauging station at

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Beulahville is upstream of the most downstream reporting agricultural irrigator (Enfield Farm), these agricultural withdrawals would reduce river levels beyond that measured for minimum instream flow calculations. This could exacerbate salinity changes by further reducing freshwater flow in the River.

Mr. Treacy stated that the “no discharge zone” mentioned in the RROD would not be required on the Mattaponi River since the King William Reservoir intake would not be a run-of-the-river withdrawal. Previous reference to a “no discharge zone” in the RROD has been deleted from the Section 8 q. of the Final RROD.

Mr. Treacy stated that the RROD did not adequately recognize the VWPP special conditions, therefore, the RROD exaggerates potential adverse impacts and minimizes potential environmental benefits. The RROD acknowledges the VWPP/401 Certificate and its conditions in several sections. However, Mr. Treacy is correct that I did not consider those conditions as part of the applicant’s plan when evaluating the proposal for the reasons outlined in the following three paragraphs.

Immediately after the Virginia DEQ issued its Virginia Water Protection Permit (VWPP)/401 Certificate Number 93-0902, the City of Newport News filed suit against DEQ and the State Water Control Board claiming that several of the restrictions of the permit were unfairly restrictive and should be removed. The permit imposed a more restrictive minimum instream flow (MIF) for the Mattaponi River than the one the RRWSG proposed (40/20 Tennant), set a higher minimum downstream release from the dam into Cohoke Creek and placed maximum limits on interbasin transfers from the King William Reservoir to the other Newport News reservoirs, all of which the City of Newport News claimed restricted the safe yield of the project to the point that it would “cripple the project” and not provide enough water to justify its construction. A ruling by the Newport News Circuit Court upheld the DEQ permit conditions and the City of Newport News did not appeal the decision, but stated that they would pursue changes to the permit when it is eligible for re-issuance in 10 years.

The challenged conditions are the very conditions that Mr. Treacy cited that would reduce some of the adverse environmental impacts associated with the withdrawal, downstream releases, maintenance of a wetland fringe and impacts at the outfall on Beaverdam Creek. As these conditions are unacceptable to the RRWSG, they have not agreed to incorporate them into their application with the Corps. For example, as a result of consultation under Section 7 of the Endangered Species Act, the U.S. Fish and Wildlife Service recommended the adoption of the Modified 80% Exceedence flowby method as a conservation recommendation for protection of the federally listed threatened sensitive joint-vetch. However, the RRWSG refused to agree to this conservation recommendation as they intended to request that the MIF stipulated in the VWPP be changed to their proposed 40/20 Tennant MIF method when the permit is re-issued in 2007.

I agree that implementation of the conditions of the VWPP/401 Certificate would reduce some of the adverse impacts of the project. However, the conditions imposed by the State in their VWPP/401 Certificate become enforceable conditions of a Corps of Engineers permit only if a permit is issued, and the RRWSG has indicated that they intend to request a modification to these provisions. Furthermore, implementation of these conditions alone would not remove all of the adverse impacts of the project nor would it cause me to find the issuance of a permit to not be contrary to the public interest.

The Mattaponi Tribe also filed suit against the DEQ and the SWCB alleging that the Board issued its permit without considering the detrimental impact the project would have on the survival of the Tribe. In

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addition, King and Queen County and several environmental groups filed a separate suit against the Board for issuing its permit. The Virginia Supreme Court decided on 2 March 2001 that these parties have standing to bring their claims in court, reversing an earlier Newport News Circuit Court decision, and the case has been remanded for full trial on the merits by lower court. Therefore, the status of the VWPP/401 Certificate remains uncertain.

Mr. Treacy disagrees with the RROD that the trapping of sediments behind the dam would adversely impact the downstream resources in Cohoke Creek and suspects that my conclusion is based largely on speculation. The character of the existing Cohoke Creek wetlands is a result of the existing balance between erosional and depositional rates in the sparsely developed Cohoke Creek watershed. Since the proposed project would result in the trapping of all sediment transport above the King William Reservoir dam site, which comprises a significant portion of the Cohoke Creek catchment, this would logically result in detrimental impacts by depriving sediment for maintenance of downstream vegetated wetlands, at least to the Cohoke Millpond.

Mr. Treacy stated that the Norfolk District routinely approves off-site and out-of-kind mitigation or preservation. He claims that I have introduced a new standard of hydrogeomorphically in-kind mitigation that is inconsistent with how other projects, including mitigation bank proposals, have been evaluated. The District has approved off-site and out-of-kind wetland compensation, as well as preservation of existing wetlands for wetland compensation credit. However, these have been for more routine projects that could be authorized under General Permits (GPs). By definition, GPs authorize projects that are anticipated to individually and cumulatively result in minimal environmental impact, and they have wetland impact acreage thresholds that individually are several orders of magnitude smaller than the proposed wetland impacts for the King William Reservoir. Additionally, GPs are not subject to the 1 to 1 functional replacement goal that has been adopted for Individual Permits (IPs) per a 1990 MOA between the EPA and the Corps. Since the proposed King William Reservoir must be evaluated by the Corps as an IP, any proposed wetland compensation plan must meet the 1 to 1 functional replacement goal. This is the standard by which the applicant's wetland compensation package has been evaluated, but to which it has consistently been found to fall short. The District's comments regarding the out-of-kind nature of the applicant's wetland compensation plan is based on hydrogeomorphic principles because this viewpoint most clearly emphasizes the plan's deficiencies in meeting the 1 to 1 functional replacement goal. As published in the Federal Register (volume 62, No. 199) on 20 June 1997, the Corps does advocate the nationwide use of the hydrogeomorphic approach to assess wetland functions for compensatory wetland mitigation purposes. The 1995 "Federal Guidance for the Establishment, Use and Operation of Mitigation Banks" is based on the premise that the lost wetland functions associated with several small wetland impacts scattered through a watershed can be more effectively compensated at a single, large consolidated wetland compensation site. The RRWSG's wetland compensation strategy proposes the exact opposite by impacting a large, intact portion of a single watershed with several, smaller proposed compensation sites located in more than one watershed.

Mr. Treacy considers it difficult to criticize the City of Newport News for refusing to preserve the wetlands downstream of the proposed dam, when the District will not consider the preservation of existing wetlands as a credit in the City's mitigation package. Mr. Treacy is mistaken on this point. Wetland areas that the RRWSG proposes to preserve in perpetuity have been given appropriate credit in the HEP, sediment retention, and nutrient assimilation functional assessments. The amount of credit may not be large since the majority of the proposed wetland preservation areas are comprised of mature, fully functioning systems, and protection of these areas would not provide an offset to the loss that would

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occur. As noted in the RROD, the RRWSG's offer to temporarily preserve the downstream reaches of Cohoke Creek is not an acceptable compensation strategy because the preservation is not in perpetuity and these wetland areas would likely be impacted by the current project proposal.

Mr. Treacy questioned how the Cohoke Creek wetlands could be an ARNI and stated that it appears to him that an ARNI is any water body so designated by EPA. He admitted, however, that DEQ is "...unaware of the criteria by which an Aquatic Resource is judged [to] be of National Importance." Mr. Treacy contends that there is nothing particularly unique about Cohoke Creek to King William County, so he does not comprehend how the wetlands could be of National Importance.

As discussed on page 68 of the RROD, EPA and/or the Service can indicate that a project will have substantial and unacceptable impacts to an ARNI as a part of the elevation process under the Section 404 (q) MOAs between the Corps and EPA and the Corps and the Service. The RROD states that the designation of an ARNI is procedural, as it applies to EPA's ability to elevate a project under the "Section 404 (q) Memorandum of Agreement between the Environmental Protection Agency and the Department of the Army." The Department of Interior has a similar MOA with the Department of Army concerning the Service's ability to elevate a decision when they determine that the project may result in substantial and unacceptable impacts to Aquatic Resources of National Importance. If a signatory agency to this MOA asserts that a resource is an ARNI, it is up to the Assistant Secretary of the Army for Civil Works to agree or disagree with that assertion. Neither the Corps nor the applicant can make a determination of the presence or absence of an ARNI. Therefore, for the purposes of the MOA, an ARNI is what the Service or EPA assert that it is, unless the ASA (CW) finds differently. An ARNI is simply an aquatic resource area that EPA or the Service believes has National importance, deserves special consideration in the permit evaluation process, and is a likely candidate for elevation under the MOA. The RROD amply documents the ecological importance of the integrated Cohoke Creek wetlands and aquatic systems, supporting EPA's and the Service's assertion. While prevalence may have an effect on determination of an ARNI, it in no way excludes an area because there are others like it in the region.

b. Virginia Department of Health: In a letter dated 24 June 1997, the Virginia Department of Health submitted comments in response to the Final EIS. The Health Department stated that Newport News Waterworks and their RRWSG partners have not increased their sources of supply as quickly as the area served has grown and the Department has required Newport News Waterworks to seek additional sources of water. The Department stated that their criteria stipulate that when a waterworks reaches a set percentage of permitted capacity, they make preparations to increase their capacity. The Health Department stated that one of their goals for the Waterworks is that they obtain the largest and best quality of water that is reasonably available because permitting for new sources is so cumbersome and time consuming.

The Health Department listed the applicant's proposed King William Reservoir with pumpover from the Mattaponi River (alternative 15) at the top of their list of preferred projects. The other options in their list in order of preference were: the King William Reservoir with pumpover from the Pamunkey River (alternative 16), and Black Creek Reservoir with pumpover from the Pamunkey River (alternative 13), Lake Genito (alternative 1), Lake Chesdin (alternative 2), Lake Anna (alternative 3), Lake Gaston (alternative 4), Chickahominy River pumping capacity increases and raise Diascund and Little Creeks Dams (alternative 18), and Chickahominy River pumping capacity increases (alternative 17). The Health Department commented that alternatives 10, 11 and 12 involving a reservoir at Ware Creek had been made moot by the EPA veto. Alternatives 19-28, involving aquifer storage and recovery, development of

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fresh and brackish groundwater wells, river water desalination, cogeneration and wastewater reuse as a source of potable water, were considered to have associated unknowns including limited ability to provide the needed volume, technological limitations, possible loss of health protection, and public acceptance. Wastewater Reuse for Non-Potable Uses (alternative 29), was considered a conservation measure which has been slow to show a major reduction in potable water needs. Water from the Rappahannock River above Fredericksburg (alternative 5), James River above Richmond, (alternative 6), surplus raw water from the City of Richmond (alternative 7), surplus treated water from the City of Richmond (alternative 8), the James River between Richmond and Hopewell (alternative 9), Black Creek Reservoir with James River pumpover (alternative 14), additional conservation measures (alternative 30), and No Action (alternative 31) did not seem viable to the Health Department as they either move potable water from one system to another, present extreme treatment problems, or do not address the need for additional sources. Brackish groundwater desalination in the Newport News Waterworks Distribution Area (alternative 23) has been implemented by Newport News Waterworks.

It should be noted that the Department of Health's stated preferences of the water supply alternatives is based on water quality and quantity to satisfy minimum health requirements. Their conclusions are, therefore, potentially quite different from those of the Corps of Engineers, which must conduct a public interest review and alternatives analysis that balances the need for the project against its adverse environmental impacts.

In a letter dated 23 July 1999, the Department of Health wrote to me disagreeing with the conclusions of the IWR report using the same tone and almost the exact wording found in Newport News' 16 July 1999 rebuttal referenced above. The Department of Health stated that their 19 May 1994 letter under Virginia Waterworks Regulations 12 VAC5-590-520 had notified Newport News that their water production had consistently exceeded 80% of their permitted capacity since June 1989 and that they should provide a schedule for increasing capacity. They stated their belief that without the King William Reservoir, the entire area would be thrown into a water crisis. Virginia regulation 12VAC5-590-520, Waterworks Expansion states, "At such time as the water production of a community waterworks reaches 80% of the rated capacity of the waterworks for any consecutive three-month period, the owner shall cause plans and specifications to be developed for expansion of the waterworks to include a schedule for construction..." and 12VAC5-590-690, Capacity of Waterworks states, "The design capacity of the waterworks shall exceed the maximum daily water demand of the system."

Comments Received on the RROD from the Virginia Department of Health: In a letter dated 3 May 2001, Dr. Anne Peterson, State Health Commissioner indicated that comments by the Virginia Department Health (VDH) on water supply need and alternative sources of supply are meant to support and supplement the comments provided in the Governor's letter. She said she hoped her comments would help convince me that the need expressed by the RRWSG is valid and that there are no practicable alternatives.

Dr. Peterson stated that HDR used the approach mandated by Virginia law, regulations and policies in calculating safe yield and future deficits and that the District must yield on this point and accept the established position of the Commonwealth as the appropriate approach. Dr. Peterson commented that the RROD made statements on pages 18, 19 and 24-26 indicating that demand reductions should be mandated by implementing water use restrictions at times other than severe drought. She later noted that the RROD acknowledges the Commonwealth of Virginia's policy that systems not rely on curtailed usage during drought situations when determining safe yield capacity, but contends that the RROD nonetheless

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used the curtailed demands in calculating safe yield and risk factors. The pages noted by the VDH quoted the Drought Plan figures that Newport News Waterworks reported in their calculations of deficit. IWR's conclusion that additional supplies would not be needed until 2015 assumed that drought contingency plans would not be used, even though such plans are in place and have been used in the past. However, in their March 2001 report, the Institute for Water Resources presented a scenario using drought curtailment to calculate safe yield, which was outlined in the RROD. However, as stated on page 31 of the RROD, I am aware of Virginia's policy against this and I did not rely on the IWR's drought curtailment scenario to justify my findings. Contrary to her contention, therefore, I have accepted the established position of the Commonwealth on this issue. Dr. Peterson also stated that IWR violated state law in its representation of the risk of water shortage. The Commonwealth of Virginia has no regulation stipulating how the risk of water supply shortages should be reported. HDR chose to report the difference between the lowest (safe) yield of water supply and the range of possible future demands, while IWR reported the risk of water shortage by comparing the range of supply and the range of demand.

Dr. Peterson commented that the RROD erroneously stated on page 30 that the VDH previously determined that the safe yield of the Newport News Waterworks could be based on the physically available storage of about 12%. She stated that the Health Department has set no number to use for dead storage when evaluating reservoirs for storage capacity or safe yield. Instead, each situation is evaluated on the basis of the best information available (bathymetric surveys, water quality impacts, etc.); and reservoirs across the state may have very different dead storage allotments (typically ranging from 15 to 30%). The City of Newport News had reported to the District that the state requires the use of 25% dead storage in calculating safe yield of new reservoirs (although Newport News was actually using 33% dead storage in their calculations for both existing reservoirs and the proposed King William Reservoir). Based on discussions with VDH staff, the District was aware that no such requirement has been set by the state. My statement on page 30 was meant to acknowledge that the state had previously allowed Newport News to use all available storage over about 12% of the storage in their reservoirs (as the lower 10 to 12% storage capacity could not be used without extraordinary treatment measures). In a telephone conversation with VDH staff after publication of the RROD, it was agreed that the wording of the above referenced sentence should be changed in the final RROD to read as follows: "The Department of Health has previously allowed the safe yield of the Newport News Waterworks system to be based on the physically unavailable storage of about 12%."

Dr. Peterson stated that recent cost increases by almost all major membrane manufacturers have virtually reversed the recent trend of cost reductions for reverse osmosis projects. She stated that there have been some marginal improvements in energy-saving applications, but stated her belief that the total costs for membrane facilities are not likely to increase or decrease significantly unless there are major technological breakthroughs. She also stated that only the Yorktown Power Plant on the York River could pre-heat water at any of the sites mentioned in the RROD and that it would be unacceptable to locate a water plant intake next to it because of major wastewater discharges in the vicinity, major commercial shipping use of the York River and possible impacts of a withdrawal on the shellfish industry in the immediate vicinity. She concluded, therefore, that the low cost of \$2.08 per 1,000 gallons is not applicable anywhere in Virginia. I acknowledged on page 153 of the RROD that "Without the power plant, the cost (at Tampa Bay) is estimated to be close to \$3.00 per 1,000 gallons, which remains less expensive than the cost to Newport News customers from the implementation of the King William Reservoir." Therefore, the fact that an intake could not be located next to the Yorktown Power Plant does not preclude desalination by reverse osmosis.

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Dr. Peterson stated that regarding desalination of James River water on page 152 of the RROD, she believes that I have misread the Health Department's wording and intent. She stated "It may be true that VDH has not absolutely, unequivocally rejected the use of this source of water. On the other hand, we were willing to consider the use of James River water as a water source only under two conditions: (1) appropriate treatment is provided, and (2) it is well documented that no other source of potable water is available." She stated her belief that treatment costs would be prohibitive and that it has not been demonstrated that no other source of supply is available, therefore, she does not consider this alternative to be "approvable" at this time. I did not misread the Health Department's wording; in fact, on page 152 of the RROD I quoted almost this exact statement from previous Health Department correspondence. The RROD states the following, "...the Virginia Department of Health considers this to be one of the least desirable of the RRWSG's proposed alternatives. The Department's position is that the best available source of water supply should be used. However, they informed the RRWSG, "We are, however, receptive to the use of raw water such as the James River below Hopewell in a situation where appropriate treatment is provided and it is well documented that no other source of potable water is available." I also noted in the RROD that "There clearly appear to be other raw water sources available to the RRWSG..."

Dr. Peterson stated, "We believe that non-potable reuse can be a contributor in reducing demands for potable water and extending the life of water supplies, by substituting water of lesser quality than potable water for uses where potable water is not necessary." However, she does not believe that it is appropriate to plan on achieving any specific level of reuse to decrease the need for potable water. She stated that the specific examples referenced in the RROD are "somewhat tenuous at best" and that my statement on page 154 of the RROD "...appears to be overly optimistic and full of 'hoped for' outcomes, with no basis for future reductions in the amount of water supplies needed." I have not stated any specific level of reuse to decrease the need for potable water, but I do believe that wastewater reuse will increase over the RRWSG's 50-year planning period. I stated on page 155 of the RROD, "I recognize that opportunities for wastewater reuse will initially be limited; however, it could eventually represent a considerable reduction in the need for increased potable water supplies. Furthermore, the more users there are, the less expensive the reclaimed water will be and the more attractive the process will become to others. Preliminary projections indicate that wastewater reuse could be economically beneficial to the power plant and refinery. HRSD estimates that the savings to local industries could far outweigh the initial costs for the new process and infrastructure. HRSD has apparently received inquiries regarding wastewater reuse from industries that are considering locating in the area. Also, Virginia's commitment to the Chesapeake Bay Initiative for restoring water quality in the Bay will likely encourage non-potable wastewater reuse within the RRWSG's 50-year planning period."

Dr. Peterson stated that "... it has not been established to the satisfaction of the Commonwealth that Norfolk has a long-term surplus anywhere close to the amount claimed by Norfolk. Further, it has not been established for how long that surplus, whatever the amount, would exist. We do not believe it appropriate to attempt to solve a long-term need ... with a short-term surplus that has been evaluated by the Department of Environmental Quality to be limited, at best." I have made no statements in the RROD to the contrary. In fact on page 155, I stated, "the exact amount of surplus and the length of time the water will not be needed by users in the southside of Tidewater has not been established." Furthermore, I outlined the comments from southside communities concerning their potential future need for the water. On page 157 of the RROD, I stated "The District has not suggested that surplus water from the City of Norfolk would meet the RRWSG's projected long-term need of 39.8 mgd. It is clear from these responses that some of the surplus will indeed be needed to serve the long-term needs of the southside

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communities. However, it appears that the surplus Norfolk water would be available in the short term and some may also be available in the long term and could serve at least some increment of the RRWGS's need when it arises."

Dr. Peterson stated that it has been a long-standing position of the Commonwealth to consider meeting the water supply needs of major population centers like the RRWSG area separately from other major population centers. Therefore, she sees no logical reason for taking water from the southside to meet the needs of the RRWSG communities. The position of the Commonwealth has apparently changed since its 17 July 1984 letter to the Norfolk District which raised no such concerns when it conditionally endorsed piping water from the James River above Richmond to Diascund Reservoir to meet the future needs of the Peninsula area. In the FEIS, the RRWSG stated "Regional cooperation promotes the concept of more effective sharing and the preservation of existing resources, reduces the competition for remaining supplies and provides the economic benefits of single large scale water supply development projects. Most importantly, combining the resources of several jurisdictions with a common need provides the opportunity of considering many more water supply development alternatives, which, in combination, can result in the selection of a plan which has the greatest benefits and least overall impacts within the region." I agree and I would hope that in the interest of regional cooperation, and promoting the best use of existing resources, the Commonwealth would support the transfer of water from a community with a surplus to a community with a need, especially if doing so would avoid adverse environmental impacts.

Dr. Peterson indicated that building a pipeline to transfer water from the Norfolk system to the RRWSG system would be a major undertaking and not as simple as attaching a pipeline to one of the bridges that cross the James River as suggested in the RROD. Therefore, she does not consider the transfer of water from Norfolk to be a solution to the water supply needs of the RRWSG area. My suggestion to attach a pipeline to one of the bridges crossing the James River is only one way that a pipeline could be constructed between the two localities that I believed might involve less expense because of the existing bridges. However, I acknowledge that there may be engineering constraints that would preclude such construction. As stated in my response to Governor Gilmore's comments above, I have not suggested that surplus water from Norfolk, by itself, should be considered as a solution to the water supply needs of the RRWSG. On page 157 of the RROD, I stated "The District has not suggested that surplus water from the City of Norfolk would meet the RRWSG's projected long-term need of 39.8 mgd. It is clear ... that some of the surplus will indeed be needed to serve the long-term needs of the southside communities. However, it appears that the surplus Norfolk water would be available in the short term and some may also be available in the long term and could serve at least some increment of the RRWGS's need when it arises" (emphasis added).

c. Virginia Department of Game and Inland Fisheries: In a letter dated 14 July 1997, the Virginia Department of Game and Inland Fisheries (VDGIF) submitted comments on the Final EIS. VDGIF stated their continued support for the development of other alternative water sources including fresh groundwater and groundwater desalination and they made several recommendations to reduce the adverse impacts of the proposed King William Reservoir proposal. They continued to recommend that the modified 80% Exceedence Minimum Instream Flow schedule be used for the Mattaponi River withdrawal rather than the applicant's proposed 40/20 Tennant method. VDGIF commented that the proposed release would represent only one-third of the normal flow in the Cohoke Creek. VDGIF indicated that research has shown reductions in stream flow of this magnitude would adversely impact aquatic biota and significantly impact downstream wetlands. As they believed the applicant's proposed downstream release would not adequately protect the integrity of fish populations and wetlands in Cohoke Creek, and

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may significantly impact water levels in Cohoke Millpond, VDGIF recommended that the release be increased to maintain median monthly flows. They also recommended release of 75% epilimnetic water between June and October to prevent temperature shock and oxygen depletion that could stress and kill fish and recommended that temperature and dissolved oxygen be monitored below the dam.

VDGIF commented that the Final EIS did not evaluate the impact of the increased frequency of high flows in Beaverdam Creek and that it is highly likely that increased flows will increase erosion, especially during periods of high flow. Therefore, they continued to recommend that the discharge point on Beaverdam Creek be moved to Diascund Reservoir. VDGIF continued to recommend 1.0-mm wedge wire intake screens with through slot velocities not to exceed 0.25 ft/sec, as well as a time of year restriction for all construction activities in the Mattaponi River from 15 February to 30 June to protect spawning anadromous fish. They concurred with the applicant's proposal to provide off-site fish passage for blueback herring and alewife and requested coordination with VDGIF for site selection and design. They recommended time of year restrictions on pipeline construction through the open field east of bald eagle nest site number 3 from 15 November through 15 July and that all nests should be protected by a management zone of 750 feet. No human activity or habitat alteration, including construction, should occur in this zone during the nesting season from 16 November through 15 July. Also, all of the forested reservoir shoreline should be protected by a management zone that extends at least 330 feet inland and prohibits clearcutting, land clearing and construction. The applicant's proposed management zone and its governing rules should be established in cooperation with the VDGIF and the U. S. Fish and Wildlife Service.

d. Virginia Department of Conservation and Recreation Division of Natural Heritage (DCR-Natural Heritage): In a letter dated 18 July 1997, the DCR-Natural Heritage provided comments on the Final EIS. The DCR-Natural Heritage made numerous comments toward improvement of the applicant's wetland mitigation plan, and disagreed with many of the statements in the Final EIS which claimed that the project would have minor impacts to the natural resources in the Cohoke Valley and the Mattaponi River. The DCR remained concerned about the effects of salinity intrusion on the significant wetland communities and sensitive joint-vetch populations along the Mattaponi River and continued to question the results of the salinity model. They commented that upper estuary communities can suffer from even slight salinity changes because they are often already at the limit of their physiological tolerances. Due to the potential for additional future withdrawals from the Mattaponi and Pamunkey Rivers, they recommended modeling multiple, concurrent withdrawals to predict changes in salinity. They commented that the applicant's proposed downstream release would not mimic the natural hydrograph below the dam and recommended the use of the Range of Variability Approach to determine the release that will provide adequate flows. The DCR disagreed with the applicant's conclusion that there would be no impacts on the sensitive joint-vetch and the reservoir would "greatly expand local bald eagle habitat." They expressed concern that backwashing of the intake pipe could impact the sensitive joint-vetch. In addition, DCR commented that the planned development and recreational activities around the reservoir would discourage nesting, roosting and foraging of bald eagles since eagles require substantial stretches of undisturbed forested shoreline. DCR stated that contrary to statements in the Final EIS, Hanover County is indeed pursuing a water withdrawal project on the Pamunkey River and recommended that the cumulative effects of such a withdrawal on the Pamunkey River be taken into consideration.

e. Governor of Virginia: In a letter dated 8 June 1999, Virginia Governor James S. Gilmore, III stated his concern over my 4 June 1999 preliminary position that the King William Reservoir is not needed. He urged me to determine that the reservoir is necessary and to issue a permit for the project as

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the state had already done. In accordance with the provisions contained in 33 CFR Part 325.8 (b)(2), when the district engineer's recommended decision is contrary to the written position of the Governor, of the state in which the work will be performed, the application must be referred to the division engineer for resolution. In another letter dated 21 April 2000, Governor Gilmore informed the District that Dr. E. Anne Peterson, State Health Commissioner, would be the primary point of contact responsible for communicating the Commonwealth's perspective on unmet water needs in the Newport News area as well as the Commonwealth's comprehensive water planning policy.

Comments Received on the RROD from the Governor of Virginia: In a letter dated 30 April 2001, Virginia Governor James S. Gilmore, III stated that he firmly believes that construction of the King William Reservoir is in the overall best interest of the citizens of Virginia. He stated that the project is critical to the economic well being and quality of life of the approximately 600,000 Virginians living in the localities that will receive water from the reservoir. He stated his belief that the conditions of the VWPP would fully protect the environment and mitigate any potential impacts.

Governor Gilmore stated his belief that decisions on major issues such as the King William Reservoir project must involve a balancing of public needs and the potential environmental, cultural and historical impacts and consider the likelihood of potential adverse impacts and possible remedies should they happen and not rely on speculation. He stated his belief that a legitimate need for the water from this project exists and any constraint on future availability of potable water in the Lower Peninsula could cast a doubt over economic development decisions.

Governor Gilmore stated that "...the Corps of Engineers is required under federal law to weigh and balance 'all those factors which become relevant in each particular case' and to identify the overall public interest balance between the project's reasonably expected benefits and its reasonably foreseeable detriments (33 CFR 320.4)." Governor Gilmore attached a document entitled "Commonwealth of Virginia Public Interest Review King William Reservoir May 3, 2001" that he said represents his detailed comments on the RROD. He stated his opinion that "...the outcome of this general balancing process is clear: the King William Reservoir project's benefits are both enormous and critical to the future of a major region of the Commonwealth..." He stated his belief that the project's environmental impacts do not significantly damage the natural, cultural or historic resources of the area and its detriments are small and capable of fair and reasonable mitigation.

The following is a summary of the comments contained in the document attached to Governor Gilmore's letter. Comments on each subject are either addressed below or in the appropriate sections of the Final RROD as indicated:

Governor Gilmore stated that the plan of the RRWSG to build the reservoir and fill it from the nearby Mattaponi River is a proven water resources engineering technique and the Norfolk District approved the same type of project in 1996 for the Hunting Run Reservoir in Spotsylvania County and has a pending application for a similar project in Stafford County. Governor Gilmore says he is troubled by the "...fundamental unfairness of the decision in light of the history of water resources decisions in eastern Virginia over the last 15 years" and cites the Ware Creek Reservoir decision. He said that despite the RRWSG's effort to follow the federal agencies' own "ground rules," the answer is still no. As stated on page 176 of the RROD, each project has its own unique need, environmental impacts, socioeconomic issues, agency concerns and project alternatives and a comparison of different projects is meaningless. There are no federal "ground rules," however, the Corps of Engineers is required to comply with all

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applicable federal laws and regulations in the evaluation of permit applications. Spotsylvania County's original proposal involved construction of a reservoir on the Po River impacting approximately 250 acres of wetlands. The District strongly recommended that the County consider less environmentally damaging alternatives; and the County subsequently decided to pursue a reservoir on Hunting Run. As ultimately permitted, Hunting Run Reservoir served a verified need with far fewer adverse environmental impacts (10 acres of waters of U.S. and 10 acres of wetlands) which were fully mitigated. Stafford County has submitted a permit application for the Rocky Pen Run Reservoir. While the environmental impacts of the project are similar to those of Hunting Run, Stafford County has yet to demonstrate a need for the water. The County has recently submitted a revised water forecast analysis, which my staff is presently reviewing.

Governor Gilmore stated that "While using more of the bottom of the reservoir does increase safe yield, neither DEQ engineers nor the City's consultants can confirm the large increases that are purported to be available from the stated changes in dead storage." He contends that the RROD and IWR overstate the potential in safe yield available from the James City County Service Authority wells. He stated that the RROD's conclusion that the Peninsula does not need any water until 2015 is based on erroneous safe yield assumptions. He disagrees with the RROD and IWR that mandatory drought conservation measures should be a planned component to foreseeable shortages. These comments are addressed in Section 7 of the Final RROD – Extent of Public and Private Need.

Governor Gilmore stated that the RROD's suggestion of using additional groundwater supplies as an alternative to the King William Reservoir is not feasible due to the finite nature of groundwater supplies, their recent declines, and the policies of the SWCB. He stated that such a suggestion indicates a lack of understanding of Virginia's available water sources. I made no such recommendation. On the contrary, I specifically stated on page 150 of the RROD "It should be emphasized that the District is not advocating the additional use of groundwater to supply the region's need unless it is determined by the state to be appropriate. The District recognizes that over-reliance on groundwater resources can result in depletion of aquifers, land subsidence and the disappearance of wetlands that are supported by those aquifers. Decisions on the availability, quality, quantity and acceptability of groundwater sources rests with the state." I am certainly not suggesting that additional groundwater withdrawals be planned to replace the entire proposed safe yield of the King William Reservoir, as indicated by the Governor. The additional groundwater withdrawals referred to in the RROD are the desalination plant already planned by James City County and the groundwater alternatives (alternatives 21 and 23) that are already components of the RRWSG's plan.

Governor Gilmore stated that the James City Service Authority's recently submitted application for a 6.3 mgd brackish groundwater withdrawal, will replace other existing withdrawals and result in a net increase of only 1.5 mgd, not 2 to 6 mgd as claimed in the RROD. He stated that it is not appropriate to consider that additional supply prior to the state's decision on the application. I merely stated on page 150, that "it may be assumed that some, if not all, of James City County's 4.4 mgd need would be met by their new groundwater desalination plant." Comments on groundwater issues are addressed in Section 7 of the Final RROD – Extent of Public and Private Need.

Governor Gilmore stated that the suggestion in the RROD that the City of Norfolk has sufficient surplus water to serve the Peninsula is wrong. He indicated that any current surplus is temporary in nature, that Norfolk's claims to a 32-45 mgd surplus is based on an inaccurate safe yield study, and that it assumes that Norfolk will completely drain the Blackwater and Nottoway Rivers during drought. He said that it

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makes no sense to build an expensive pipeline across Hampton Roads when growth in southeastern Virginia will erode the surplus within the next few decades. Contrary to the Governor's assertion, I stated on page 157 of the RROD "The District has not suggested that surplus water from the City of Norfolk would meet the RRWSG's projected long-term need of 39.8 mgd. It is clear ... that some of the surplus will indeed be needed to serve the long-term needs of the southside communities. However, it appears that the surplus Norfolk water would be available in the short term and some may also be available in the long term and could serve at least some increment of the RRWSG's need when it arises" (emphasis added).

While the applicant's consultants, Malcolm Pirnie, Inc. have reviewed the Norfolk Safe Yield Study and identified what they consider to be inaccuracies and deficiencies in it, even by their assessment, Norfolk has approximately 30 mgd of surplus water available at the present time. The City of Norfolk is confident of the accuracy of their study, and that the utility is using it accordingly. Although the RRWSG projects that the southside communities will need all of the available surplus in the future, this is by no means certain. The RRWSG may be overestimating the long-term need of the southside region. Whether or not the southside may eventually need some or all of this water, in the meantime, this surplus water could be made available to Lower Peninsula users.

The Governor described another alternative mentioned by Norfolk District, which would rely on the James River at Richmond. He stated that reliance on the James River to supply water for two major population centers would cause environmental damage to the source and the Commonwealth cannot rely on a single source to supply water to two major population centers. He stated further that as the City of Richmond has no major reservoir, instream flow protection for the James River is not possible without threatening public health, and during the drought of 1999, a large percentage of the instream flow was required for offstream uses. Furthermore, Richmond and Henrico County have plans to increase their treatment capacity, requiring additional water from the James River.

The Governor is referring to one of a number of possible sources of water, which incrementally could meet part of the Peninsula's projected need. I am not advocating that two major population centers rely entirely on the James River. While it is not likely that large amounts of water would be available from this source due to the needs of the Richmond area municipalities, the Richmond Regional Planning District itself acknowledges that excess water may be marketed outside the region, as stated in the RROD, page 152; and the FEIS states that ± 7 mgd could be available for the long term. Contrary to the Governor's assertion that instream flow protection for the James River is not possible without threatening public health, minimum instream flow criteria have already been established for the James River around Richmond. This MIF solution for the James River was developed in cooperation with localities, federal and state resource agencies and the interested public, which included environmental and recreational interests within the falls of the James River. It is designed to avoid environmental damage to the river and to maintain sufficient water for critical instream uses, including anadromous fish use, recreation and water quality maintenance. This plan was also included in the River Management Plan initiated by the City of Richmond and Henrico County which was endorsed by both the Corps of Engineers and the Virginia Department of Environmental Quality under the Surface Water Management Program. Increased future water needs from Richmond area localities may reduce the amount of excess water available to the lower Peninsula, but for the foreseeable future, some of the RRWSG's long-term water needs could be met using this source.

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The Governor stated that instream flow protection proposed for the Mattaponi River in the VWPP, associated with the King William Reservoir withdrawals, is fully protective and that withdrawals cease when the river falls to between 85% (spring) and 23% (summer) of its average flow. The average flow numbers presented by the Governor are not as appropriate as monthly flows, as flows vary by month. Therefore, it is more appropriate to review the data based on monthly flows rather than average annual flow. However, I agree that the modified 80% exceedence MIF required in the Virginia Water Protection Permit is more protective of instream flow than the 40/20 Tennant MIF originally proposed by the RRWSG. However, the RRWSG originally applied for greater withdrawals, and they have indicated that they will request a permit modification when the VWPP is re-issued in 2007 to allow for increased withdrawals. Therefore, the restrictions currently imposed by the Commonwealth's permit do not preclude additional possible impacts to the aquatic resources in the Mattaponi River.

The Governor stated that Henrico County and the City of Richmond have plans to add 138 mgd of new treatment plant capacity, thus additional water from the James River will be used in the Richmond area. He stated that pursuit of the James River as an alternative to supply water for the Lower Peninsula as well will "result in some of the Nation's finest urban whitewater and small mouth bass fishery becoming a virtual rock garden on a regular basis."

According to the permit record of the Norfolk District, Henrico County is currently permitted to withdraw up to 55 mgd of water above Boshier Dam once the new treatment facility comes on line in 2002. The County has requested modification of the subject permit to allow up to 80 mgd of withdrawal above Boshier Dam. The City of Richmond is currently authorized to withdraw up to 132 mgd at their existing facility and has proposed treatment plant capacity expansion up to 150 mgd. Therefore, the additional withdrawals to be anticipated by the City of Richmond and Henrico County totals 98 mgd, not 138 mgd as stated in Governor Gilmore's letter. In addition, the MIF conditions shown above must be maintained by both parties in order to insure instream resources would be protected. These withdrawals, in concert with the flow oscillation of the Richmond canal system, will allow additional water capacity to support other users, including the RRWSG. Sufficient controls are in place, and will continue to operate even if the RRWSG were to acquire water from the James River to prevent the Governor's anticipated "rock garden" from occurring.

Governor Gilmore discussed the problems with surface water desalination as well. He stated that it would be extremely difficult to achieve consistent treatment of water to drinking water standards from sources with a high degree of variability, and the costs of doing this would be excessive. He stated that other major problems arise from industrial contamination in the James River below Hopewell and that minimum instream flow limitations eliminate the Pamunkey River as a source. As the Governor correctly stated, the Virginia Department of Health has concerns over the use of the James River below Hopewell due to chemical contaminants. This is acknowledged on page 152 of the RROD. However, as is also stated in the RROD, the Virginia Department of Health informed the RRWSG, "We are, however, receptive to the use of raw water such as the James River below Hopewell in a situation where appropriate treatment is provided...." The RROD concludes that this alternative may not be practicable, as there appear to be other raw water sources available to the RRWSG, however, the Health Department has clearly not rejected the use of this water. Regarding the use of the Pamunkey River as a water source for desalination, I agree with the Governor that Pamunkey River desalination, without new raw water storage, would not be feasible, and so stated in the RROD on page 152.

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It is not clear, however, despite the Governor's assertions, that desalination is not feasible because of technological limitations and excessive cost. This point is addressed in detail in the RROD, pages 152 and 153. The cost and reliability of desalination has improved greatly in recent years, and as technology continues to improve, reliability and cost are expected to become less of a concern. As the RRWSG is proactively planning for water needs extending far into the future, it is not unreasonable to anticipate even greater advances in technology regarding surface water desalination.

The Governor questioned the feasibility of non-potable wastewater reuse, stating that it cannot be depended upon to reduce long-term treated water demands. He further stated that the federal agencies agreed that wastewater reuse for non-potable uses should not be carried forward for analysis as an alternative, but should be analyzed as a conservation measure only. I agree that non-potable wastewater reuse should be considered a conservation measure as opposed to a stand-alone alternative, and I stated this on page 154 of the RROD, "...such opportunities to reduce the demand for potable water for industrial processing and irrigation should be investigated and encouraged as an additional conservation measure." I also agree that wastewater reuse will not significantly reduce water demands for the immediate future, and as I stated in the RROD, "I recognize that opportunities for wastewater reuse will initially be limited; however, it could eventually represent a considerable reduction in the need for increased potable water supplies." I also believe that since Virginia is committed to the goals of the Chesapeake Bay Initiative to restore water quality, non-potable uses of wastewater will most likely increase over the RRWSG's 50 year planning period.

I am not suggesting that any one of the alternatives evaluated in the FEIS or the RROD would, by themselves, replace the King William Reservoir and meet all of the Peninsula's future water needs. However, as stated in the RROD, a number of these alternatives could be used together, each incrementally meeting some of the demand. It is not necessary that all of the water comes from one source, and it may even be desirable to capitalize on a number of sources.

Governor Gilmore stated that a 1990 report by the U.S. Fish and Wildlife Service did not list the wetlands at Cohoke Creek as important or scarce and he considers them "not unlike the wetlands of many of our streams in the upper Coastal plain." He believes that what makes Cohoke Creek unique is its deeply incised topography, making it an ideal reservoir site. He compared the mitigation requirements of the District's creation and restoration ratios to the King William Reservoir project, and discussed the screening and selection process for the mitigation sites. Governor Gilmore stated his confidence that the mitigation plan developed by the applicant would more than double the amount of wetlands flooded by the reservoir, and the wetland functions would also be adequately replaced and surpassed over time. These comments are addressed in Section 8 f. (2) of the Final RROD – Ecological Impacts of the Proposed Work.

Unlike the RRWSG, Governor Gilmore concurs with the District that a site that supports a colony of small whorled pogonia would be destroyed by the reservoir. He also correctly stated that the U. S. Fish and Wildlife Service determined that the loss of this population would not likely jeopardize the continued existence of the small whorled pogonia. He stated various reasons for his belief that the concerns raised over indirect impacts to sensitive joint-vetch populations on the Mattaponi River are not valid. He outlined the applicant's proposals to compensate for the loss of the small whorled pogonia colony and to minimize threats to the sensitive joint-vetch. He stated his belief the wooded buffer may enhance bald eagle nesting habitat and that the Department of Game and Inland Fisheries does not anticipate significant

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adverse impacts to bald eagle nesting as a result of the project. These comments are addressed in Section 8 f. (2) of the Final RROD – Ecological Impacts of the Proposed Work.

Governor Gilmore commented that the Norfolk District is using unfounded claims of potential adverse impacts to water quality as a reason for recommending permit denial, specifically the District's concerns about changes in salinity. My recommendation for permit denial is based on numerous factors, which when considered cumulatively, result in the proposed King William Reservoir having unacceptable adverse impacts to environmental and cultural resources. The VIMS salinity intrusion model does in fact predict a long-term salinity change in the most sensitive freshwater/oligohaline transition zone in the Mattaponi River. The projected salinity changes resulting from a proposed water withdrawal of this magnitude and the possible ramifications of those changes for wetlands and fish and wildlife resources in the Mattaponi River justifies concern on the part of the District, despite the RRWSG's and the Governor's claims that they are negligible. Furthermore, as stated in the RROD on page 48, the Virginia Department of Conservation and Recreation noted that salinity alone is not an adequate variable for predicting all effects of the withdrawal of freshwater on plants and animals. Freshwater withdrawal may alter water chemistry, including concentrations of bioavailable nutrients and inorganic elements.

The Governor's letter reiterates the RRWSG's claims that the salinity simulation model employed by VIMS proves that the water withdrawal would produce "very little change," including no increase in the average salinity in an area with natural large salinity fluctuations. The Governor stated that project opponents sought to "discredit" the model, but that the Corps Waterways Experiment Station (WES) found that the model was technically sound.

Although WES found that the one-dimensional VIMS model was "essentially sound," WES also noted that the model and data comparison at various transects were not always good. The VIMS model does, however, predict an upstream migration of salinity. Furthermore, the City of Newport News and the Governor continuously refer to "average" salinity conditions. I stated in the RROD and in my response to City's comments that averaging salinity changes obscures any ecologically important effects they may have on river biota and is therefore of limited predictive use. As stated in the RROD, species may be harmed by acute salinity impacts that would occur during maximum pumping events, which would also likely occur when fresh water inputs to the river are low. Even a long term change in salinity as slight as 0.1 ppt could cause a significant decrease in growth and reproduction for some organisms, particularly those in the low-salinity upper estuary that are already at the edge of their physiological tolerances. The evidence presented both by the VIMS model and other studies suggests that the project would result in changes in salinity, which could have an adverse impact on both the federally listed threatened sensitive joint-vetch populations in the immediate vicinity of the intake and fish and wildlife resources in the river. This issue is discussed in greater detail in Section 8 e. of the Final RROD.

Governor Gilmore stated that the model predicts little or no impact to salinity despite using an average withdrawal rate that is more than twice the level that is expected to occur. However, the RRWSG itself stated that the 40 mgd withdrawal rate includes a projected average withdrawal of 32.6 mgd to supply the RRWSG's currently proposed KWR-IV configuration, and 5.5 mgd for non-RRWSG uses. While clearly the RRWSG would not always need the maximum available water from the Mattaponi River, they anticipate pumping, and are authorized under their Virginia Water Protection Permit, as much as 75 mgd from the river as needed. It is not possible, therefore, to presume that, at any given time, no more than 18 mgd would be withdrawn. In fact, more water is generally required during times when freshwater input to the river is at its lowest rate and other consumptive uses are at their highest, when, in fact, the effects of

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the withdrawal on aquatic resources would be greatest. The relevant factor is not the average withdrawal rate but the maximum rate and the time of year and river conditions that accompany this withdrawal. The maximum withdrawal rate, which would include the RRWSG's 75 mgd withdrawal plus the additional foreseeable consumptive uses, could be expected to have an even higher impact on instream salinity levels than the model shows.

The Governor stated that the "RRWSG also responded to a criticism of not considering the cumulative effect of withdrawals from both the Mattaponi and potential future Pamunkey River withdrawals." I addressed the City of Newport News' comment on the cumulative effect of withdrawals from both the Mattaponi and Pamunkey Rivers in my response to the City's comments. This issue is also addressed in the RROD, page 47.

Governor Gilmore disagrees with the statement in the RROD that another 45 to 120 mgd of additional pumpover from the Pamunkey River should be viewed as reasonably foreseeable. He stated that any additional pumpover from the Pamunkey River, which could be needed in the future, would have to be located in either Hanover or King William Counties. He stated that King William County does not need the water and is opposed to the idea. The Governor contends that Hanover may need water, but it would be a non-consumptive use and should not affect the salinity of the York River. He contends that Hanover County is expected to purchase water from Richmond, and this interbasin transfer from the James River has the effect of making the Pamunkey River/York River system more fresh, not less.

As noted by the Governor, the RROD does state that an additional 45 to 120 mgd of additional pumpover from the Pamunkey River should be viewed as reasonably foreseeable. It is foreseeable because it was proposed by the RRWSG. As stated in the RROD on page 193, "In the City's Development Agreement with King William County, a Pamunkey River pump station is included to provide a second pumpover to the proposed King William Reservoir as a way to enhance the safe yield of the reservoir and to supply additional water to as yet unidentified users." Although the RRWSG stated that they had no immediate plans to pursue the second pumpover and they have not identified prospective users, they clearly have not abandoned the potential for such an option. This additional sustained withdrawal would result in further increases in salinity and other chemical changes and further ecological effects on resources in the Pamunkey, Mattaponi and York Rivers. There is certainly no guarantee that King William County will not need additional water for its own future use and in addition to Hanover County, it is possible that New Kent County will also need additional water from the Pamunkey River. Contrary to the Governor's assertion, any water withdrawal from the Pamunkey River proposed by Hanover County or the RRWSG would likely be for consumptive uses, with the possibility of altering the salinity regime in the river. However, the details of such a withdrawal have not been presented or evaluated. If Hanover County met its future needs by taking water from the James River, a portion of the resulting treated wastewater could conceivably be discharged into the Pamunkey/York River system, but there has been no review of whether this would happen, how much water would be discharged and what effects this would have on the river. Contrary to the Governor's statement, it cannot be assumed that this would make the Pamunkey River/York River system more fresh.

Governor Gilmore disagrees with the statement in the RROD that there would be permanent adverse impacts to Beaverdam Creek from the 7-fold increase in average flow conditions as this assumes that the VWPP conditions designed to restrict cumulative interbasin transfers either do not exist or have no effect. Governor Gilmore's comments on this issue are addressed in Section 8 d. (2) of the Final RROD— Outfall on Beaverdam Creek.

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Regarding fish and wildlife issues, Governor Gilmore stated that the Virginia Water Protection Permit (VWPP) incorporated all of the Department of Game and Inland Fisheries (DGIF) recommendations to protect fisheries resources in the Mattaponi River, including maintaining 80% Exceedence Minimum Instream Flows. As the Governor correctly noted, the VWPP does limit water withdrawals from the Mattaponi to comply with the Modified 80% Exceedence Minimum instream Flow regime, as required by the VWPP. However, the RRWSG originally applied for greater withdrawals, and they have indicated that they will request a permit modification when the permit is re-issued in 2007 to allow for increased withdrawals. Therefore, the restrictions currently imposed by the Commonwealth's permit do not preclude additional possible impacts to the aquatic resources in the Mattaponi River.

The Governor also noted that the VWPP incorporates VDGIF's recommendations on intake design to reduce entrainment and impingement of anadromous fish eggs and larvae. The Governor stated that the current design provides the maximum protection to early life stages of the fish. Furthermore, the permittee plans to monitor the intake for three years, would not conduct instream work during spawning periods and would use hydraulic dredging to minimize turbidity. The Governor stated that re-suspension of shad eggs in the water column is unlikely due to their size and general location.

I agree that the intake design conforms to the recommendations of various wildlife agencies and I acknowledged this in the RROD on page 112, "The applicant has designed the intake in accordance with the recommendations of the National Marine Fisheries Service and the Virginia Department of Game and Inland Fisheries (VDGIF) to reduce impacts to anadromous fish. The intake design incorporates wedge-wire slot mesh screens with one-millimeter screen openings and entrance velocities not to exceed 0.25 feet per second. Also, the intakes would be placed midway between the river bottom and the average water surface to avoid those eggs that float on the surface or roll on the bottom." I concluded that "these measures should reduce impacts to anadromous fish and larvae." However, even the best currently available technology will still have impacts an already beleaguered and important fisheries resource, particularly as the intake facility is located within the prime spawning area of American shad. This is also stated clearly in the RROD, on page 112. Furthermore, the VDGIF had other recommendations and requests that have not been addressed, either by the RRWSG or in the VWPP. In their letter of November 12, 1993, VDGIF recognized that, despite the laudable efforts by the RRWSG to design the intake screens to minimize impacts to anadromous fish populations, entrainment and impingement are inevitable and could affect large numbers of fish eggs and larvae. The agency recommended further study of "the ramifications of direct impingement and entrainment of fish eggs and larvae, which could serve as a localized impediment to stock recovery." Specifically, they requested a thorough study to monitor ambient egg and larval densities and spatial distributions in the proximity of the intake. And they strongly recommended that the applicant collect detailed cross sectional depth and velocity measurements with corresponding diurnal egg and larval drift data. They state that they "want to know where, when, what kind, what size, and how many eggs and larvae pass through the withdrawal area at various tidal regimes and light attenuations." Despite the Governor's claims that the project would not result in adverse affects on anadromous fish, his own fisheries experts from his Department of Game and Inland Fisheries have expressed concerns about this very issue. Some of this information is included in the monitoring plan developed by the interagency task force, but as indicated by Dr. Garman, it is impossible to adequately assess potential impacts of the project without this baseline data and it is premature to conclude that the project would not impact anadromous fisheries resources.

The Governor commented "the potential loss of production from the Mattaponi due to entrainment of 'eggs and juveniles of other fish species and food particles' cannot be assessed or predicted with existing

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information.” I agree with the Governor, as discussed in more detail in my response to the City of Newport News’ comments. This complete lack of biological and ecological information on the fisheries resources in the Mattaponi River makes it impossible to assert with credibility that the proposed withdrawal would not impact the shad population. In evaluating all of the available information, I agreed with the U.S. Fish and Wildlife Service that the project as a whole could impact American shad (RROD, page 195).

Governor Gilmore believes that the Zydlewski and McCormick study referenced by Dr. Cheslak and cited in the RROD, page 112, is not relevant to this project, as larval shad would not be exposed to salinities approaching seawater levels (35 ppt). The relevance of the Zydlewski and McCormick seawater salinity study is in the understanding it provides of the shad’s osmoregulatory processes, which allow the fish to move from freshwater to more saline conditions. The study demonstrates that American shad develop salinity tolerance at the onset of metamorphosis, which occurs between 36 and 45 days post hatch (Zydlewski and McCormick 1997). It is not known whether the small but permanent increase in salinity along with other chemical, physical and biological changes projected as a result of the RRWSG water withdrawals would affect the shad.

The Governor cited two studies, (Limburg and Ross, 1995 and Zydlewski and McCormick, 1997), and indicated that these show that the relative condition of American shad larvae is higher in salinities between 5 and 15 ppt than in freshwater. It is surprising that the Governor would cite the Zydlewski and McCormick paper, since he stated immediately before this comment that it deals with much higher salinities and, therefore, isn’t relevant to the King William Reservoir project. Moreover, the Zydlewski and McCormick study makes no reference at all to the relative condition of shad larvae raised in salinities in the range of 5-15 ppt. In fact, the paper states that “the results support the hypothesis that growth rates in fresh water and seawater do not differ” (Zydlewski and McCormick, 1997). The Limburg and Ross paper (1995) does report that indices of relative condition were lowest in the freshwater treatments and higher in the treatment involving salinities between 5 and 15 ppt. This study is a highly controlled laboratory experiment of questionable experimental design, which looks at salinity independent of other variables. I am reluctant to make broad inferences that extend beyond the scope of the study. Notwithstanding this one study, credible scientific research showing the tolerance of shad eggs and larvae across a range of salinities, temperatures and other conditions important to the success of shad (i.e. dissolved oxygen, pH, turbidity, suspended solids) is lacking.

What is clear is that adult American shad spawn exclusively in fresh water and that the project would result in an upstream migration of oligohaline (0.5 to 5 ppt) water. Without better knowledge of the range of conditions present in the Mattaponi River, or tolerable to shad larvae and juveniles, it would be premature to conclude that the expected salinity increases would have no effect on the shad populations.

Governor Gilmore stated that the Virginia Water Protection Permit incorporates the VDGIF recommendations regarding instream flow releases to Cohoke Creek and that these releases would track seasonal flows and maintain the wetlands downstream of the dam in their existing state. He stated that the permittee is also required to monitor water temperature and dissolved oxygen concentrations to ensure compliance with water quality standards, and that multiple release elevations in the reservoir would prevent discharge of anoxic, hypolimnetic water and temperature shock to downstream biota. He stated that the feasibility of releases that more closely mimic the natural hydrograph was also evaluated.

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The Norfolk District and the Federal advisory agencies have determined that the high and low flow values in Cohoke Creek are important to the maintenance of the downstream ecosystem. The FEIS (pg. 5-18) clearly acknowledges that the proposed downstream releases of the RRWSG would, "...represent one third or more of the estimated average flow at the dam site" and this is repeated in the RROD, page 50. Although the DEQ permit requires the use of median monthly flows, based on the recommendations of VDGIF, the District believes that maintaining a more variable, year-round release that mimics the natural variation in the hydrograph, as recommended by the U. S. Fish and Wildlife Service, is required. The District conducted an independent analysis of the project and concluded that the downstream releases must be within 10 percent of the pre-reservoir flows in order to protect the Cohoke Creek community. It should be pointed out that the RRWSG did not accept the DEQ condition requiring downstream releases based on a median monthly flow requirement. The DEQ, in their response to the RROD also stated that they are willing to consider alternate proposals, which replicate the high flow and drought events using a range of variability approach. The DEQ was also a participant in the process that developed the recommendation presented in the RROD. The City of Newport News acknowledges that their proposed release would range from 19 to 61 percent of the pre-project streamflow. The District believes that the loss of as much as 81 percent of the downstream flow represents an unacceptable impact to the Cohoke Creek ecosystem and that the loss of the highest flows would have a negative impact on the downstream community.

Governor Gilmore also cited the increased recreational opportunities of the proposed King William Reservoir for boating, fishing, hiking and wildlife watching; and the development of five parks around the reservoir. These recreational opportunities were acknowledged in the RROD on pages 135, 158, and 186. However, that DGIF, the U.S. Fish and Wildlife Service, and Dr. Garman have all expressed concerns regarding the stocking of non-native species in the reservoir. This issue should be addressed if a decision is made to issue a permit for the subject reservoir.

Governor Gilmore contends that the proposed mitigation efforts associated with the reservoir would offer various wildlife benefits for species such as Canada geese, and edge species such as white tailed deer. The District does not dispute that the proposed King William Reservoir would result in habitat for a relatively few generalist species for which suitable habitat is not a limiting factor in Virginia.

Governor Gilmore outlined his understanding of the federal process and responsibilities under Section 106 of the National Historic Preservation Act and presented a chronology of the District's consultation with the VDHR, ACHP, the applicant, affected Indian tribes and other interested parties. I generally agree with his account, as it closely reflects the chronology that appears in the RROD. Governor Gilmore's comments on Section 106 consultation are addressed in Section 8 m. of the Final RROD – Historic Resources and Traditional Cultural Properties.

Governor Gilmore indicated that the RROD focuses primarily on potential adverse impacts the project might have as opposed to the potential adverse impacts that permit denial might have. He believes that all citizens of the Commonwealth, including the Tribes, would benefit from the reservoir, either directly from water supply or indirectly from associated economic growth. Governor Gilmore's comments on socioeconomic issues are addressed in the Socioeconomics and Environmental Justice Sections of the Final RROD.

Governor Gilmore stated that neither Executive Order 12898 nor federal agency guidance requires denial of projects when no intentional discrimination can be shown. I agree that denial is not required, however,

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this does not mean that a project cannot be denied in order to avoid adverse effects. In this case, my recommendation for denial was based not only on environmental justice, but also on impacts to cultural resources, wetlands and other environmental impacts.

Governor Gilmore stated his belief that the reservoir project would not adversely impact the hunting and fishing rights of the Mattaponi and Pamunkey Tribes. He believes that the conditions of the VWPP ensure no impact on water levels, that changes to salinity would be virtually undetectable and that the project would have no adverse impact on the fishery in the Mattaponi River or the Pamunkey River. He stated that the project would not reduce game in the vicinity of the reservations, rather, he believes that wildlife habitat provided by the reservoir and buffer would likely enhance the numbers and types of game and waterfowl species in the area. These comments were addressed in the Environmental Justice Section of the Final RROD.

Governor Gilmore stated that although many members of the Tribes oppose the reservoir because it would adversely impact their traditional way of life, their fisheries and their religious practices, he believes that “For better or worse, we have long accepted the necessity of altering and developing selected parts of the natural environment to meet undeniable human needs, such as safe, reliable and adequate public water supplies.” He feels that while the Tribes beliefs concerning the “interrelatedness of all living things” and “the responsibility which Indian people have for maintaining their ancestors’ lands” should be respected, such beliefs must not always prevail in decision making. He stated that “To adopt as public policy the Tribes’ desire ‘to maintain the earth in the condition in which it was entrusted to all of us’ would bring a complete halt to all future land development.” Governor Gilmore feels that the mitigation plan and permit conditions would protect the environment to the extent that the benefits of the project would significantly exceed its remaining adverse impacts.

I agree that such beliefs must not always prevail in any given circumstance. In this instance, however, these impacts would occur concurrently with other impacts to Native Americans, wetlands, water quality and other natural resources. I disagree that the benefits of the project would exceed its adverse impacts. The District analyzed the reasonably foreseeable benefits of the project against the reasonably foreseeable detriments. In light of the unjustified need, the degree of impacts, and the availability of other alternatives, the reservoir proposal was determined not to be in the public interest and I concluded that a recommendation of denial was appropriate.

Governor Gilmore stated his belief that the impacts on baptisms and Easter Sunrise services on the Mattaponi River, as well as impacts to the natural environment can be adequately and appropriately addressed. He believes that there would be no measurable changes in the physical qualities of the Mattaponi river and that the project would not reduce or inhibit tribal access to traditional locations of these activities. As stated in the RROD, the Mattaponi Tribe has many religious and spiritual ceremonies closely associated with the River, which they consider “sacred waters.” The Tribe believes that disruption or “defiling” of the River and its flow would create an imbalance in the circle of life and dishonor the Tribe’s ancestors and Mother Earth. It is not access to the River for these services that would be disrupted, rather it is the spiritual aspect of the Mattaponi River to the Tribe. This spiritual and religious importance is a vital cultural value that may be difficult for non-native people to understand. However, lack of understanding by non-Indians does not invalidate this value. As discussed in the RROD, all of the Tribes have indicated that there are no measures that would adequately mitigate for their losses. Impacts regarding access or physical qualities of the River were not the only factors considered. The District has determined that the overall impacts to the Tribes cannot be adequately compensated.

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Governor Gilmore disagrees with the conclusion in the RROD that residential growth associated with the project might impact the tribes. He said the FEIS indicated that the project is not likely to promote much new residential or business growth in the area. Also, King William County has indicated that building, land disturbing activity and clearing or vegetation removal would be severely restricted within the reservoir buffer areas. This comment is addressed in Section 8 t. of the Final RROD – Environmental Justice.

Governor Gilmore contends that the Norfolk District should not have concluded that consensus between the Tribes and the applicant was not possible when all parties were still engaged in the consultation process and when it was not clear that consensus would not be reached. He believes that if the process had been allowed to continue, agreement would have been reached and any remaining impacts would have been mitigated to the benefit of the Tribes and residents of the Peninsula. Governor Gilmore stated that consultation continued with individual tribal communities at their reservations with the participation of District staff as well as the ACHP and VDHR, after the District had made a unilateral decision to “terminate” consultation. These comments are addressed in the Final RROD in Section 8 t. – Environmental Justice and in the Section 8 m. – Historic Resources.

f. Virginia Secretary of Natural Resources: In a letter dated 25 August 1999, the Virginia Secretary of Natural Resources, John Paul Woodley, Jr. wrote to me to reemphasize the Commonwealth’s position of support for the proposed King William Reservoir and their disagreement with the conclusions of the IWR report. As further support for the state’s position, Mr. Woodley stated that if the King William Reservoir had been in place during the recent drought, under the conditions of the DEQ permit, very little water could have been taken from the Mattaponi River over the past 13 months, thereby protecting its aquatic life. Mr. Woodley encouraged me to reconsider and reverse my preliminary position to deny the permit.

g. U.S. Senator Charles S. Robb: In a letter dated 12 April 1999, former Senator Robb wrote to me seeking the status of the permit application on behalf of one of his constituents, Mr. Larry E. Parker.

A letter dated 2 March 2000 was received jointly from former Senator Robb, Senator Warner, Congressman Scott and the late Congressman Bateman requesting that the District’s record on the King William Reservoir permit application remain open for comment until they had an opportunity to meet with General Rhoades, Commander of the North Atlantic Division, to discuss the procedures that would be followed when the final decision is referred to the Division. Subsequent to that meeting, General Rhoades provided instructions to the Norfolk District in a letter dated 21 April 2000 that outlined the procedures to be followed for completing the review and forwarding the District’s recommendation on the permit application to the Division.

h. U.S. Senator John Warner: Senator Warner was a signatory to the 2 March 2000 letter to the District described above.

i. Congressman Herbert H. Bateman: In a letter dated 26 July 1999, the late Congressman Bateman informed me that he had read Newport News’ rebuttal to the IWR report and was even more convinced of the need for the King William Reservoir. Congressman Bateman was also a signatory to the 2 March 2000 letter to the district described above.

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j. Congressman Robert C. Scott: Congressman Scott was a signatory to the 2 March 2000 letter to the District described above.

In a letter dated 2 May 2001 commenting on the RROD, Congressman Scott wrote that he remains concerned that the Virginia Peninsula be able to develop a reliable supply of water to meet future demands in an environmentally acceptable manner. He stated that he had been assured that the decision would be based on the merits of the project, however, as the RROD made reference to the number of letters, postcards and petitions received for and against the proposal, he believes that this suggests that political support will be a factor in my decision on the project. Congressman Scott stated that the RRWSG has made a substantial investment in the project and that it should not be judged by which side can generate the most phone calls, letters and petitions. He urged me to return to the analysis of the facts and alternatives for a new regional water supply.

As outlined in the 212-page RROD, my recommendation on this project is based on a full and complete analysis of the merits of the project including need, impacts and alternatives. The one sentence citing the number of letters received for and against the project states a factual accounting of the interest of the general public in the project and in no way indicates that numbers alone would or could influence the outcome of the District's required analysis under applicable laws and regulations.

k. U. S. Senator George Allen: (Senator Allen was elected in 2000.) Senator Allen wrote a letter to Lt. General Robert B. Flowers, Chief, U. S. Army Corps of Engineers, on 3 May 2001 expressing support for the King William Reservoir Project. Lt. General Flowers forwarded this letter to me for consideration in my final RROD. Senator Allen indicated that the project is very important in the pursuit of future water supply in the cities of Newport News, Hampton, Williamsburg, Poquoson and the counties of York, James City, New Kent and King William. He stated that new water assessments reaffirm the need for 22 to 27 mgd of water by the year 2050 and that current supply cannot meet this demand. He stated his belief that the concerns that have been raised over the impact the project may have on the environment and the Indian tribes would be mitigated through meaningful compensation and that there would be no adverse impact on the nearest reservation. He feels that the preservation aspects of the undertaking only strengthen the argument for allowing the project to go forward. He stated his belief that granting a permit for the King William Reservoir project is the only solution to the looming water crisis and he encouraged Lt. General Flowers to go forward in the interest of the citizens of this region and Virginia as a whole.

As Chief of Engineers, Lt. General Flowers is not currently involved in the decision on this project. My Final Recommended Record of Decision will be sent to Brigadier General Rhoades at the North Atlantic Division for his review and decision. Each of the issues raised by Senator Allen are addressed in the Final RROD.

l. Congresswoman Jo Ann Davis: (Congresswoman Davis was elected in 2000.) Congresswoman Davis wrote on 1 May 2001 to express her support for my Record of Decision denying the permit for the King William Reservoir. She indicated that her opposition to the project stems from the overstated water needs of the Peninsula by the Newport News Waterworks' consultants; the lack of exploring alternative options such as investing in desalination technology and dredging existing reservoirs; an overwhelming majority of citizens of King William and King and Queen Counties objection to the proposed reservoir site, and the negative cultural and economic effect on the Mattaponi and Pamunkey Tribes.

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m. Virginia Council on Indians: The Virginia Council on Indians submitted a letter to the District on 8 November 1996 commenting on the project on behalf of the Mattaponi Tribe. They stated their concern over the environmental impacts of the project and that they believed Newport News could find a different area to concentrate the need to supply water for their communities. A second letter was written to the District on 23 June 1997, which stated that the Mattaponi Tribe had the support of the Council in their quest to stop the project. The Council also submitted a letter of 25 June 1998 to Professor Danielle Moretti-Langholtz, a contributor to the TCP study. This letter was included in the TCP Report. The letter states, "The members of the Virginia Council on Indians, the only official agency of the Commonwealth representing American Indian people and coming under the guidance of Health and Human Resources, are opposed to the King William Reservoir. We are strong in our belief that if this reservoir becomes a reality, it will surely change the Mattaponi Indian Reservation and the wetlands surrounding it. The Virginia Council on Indians supports the Mattaponi Indians in their quest of the opposition to the proposed Cohoke reservoir in King William County." This letter contained the signatures of 12 members of the Council. In addition, the Virginia Council on Indians was a consulting party in the Section 106 process and participated by attending meetings, and submitting comments in several other letters.

In a letter dated 20 November 2000 addressed to General Rhoades, Reeva Tilley, Chairman of the Virginia Council on Indians indicated that she understood that the RROD would soon be published to solicit public comments on the proposed King William Reservoir project. She indicated that she wrote on behalf of the members of the Virginia Council on Indians to support the District's preliminary decision to deny the King William Reservoir. She stated that "This project will destroy the most important resource to the Mattaponi people, their sacred river, the 'lifeblood' of their community. Fishing on this river has always been a part of their heritage and way of living for their families." She urged the District to "...evaluate the (e)ffects the reservoir might have on the river and the surrounding community should the Corps of Engineers approve this permit."

n. Virginia Senator Martin Williams: Virginia Senator Williams wrote on 3 May 2001 to express his objection to my recommendation of denial, as a Peninsula resident, an elected representative at the state level and as a citizen committed to the future and potential of the region. (Senator Williams is also an officer in the consulting firm, Environmental Specialties Group, Inc., which has been retained by the City of Newport News to assist in the preparation of the wetland mitigation plan for the project.) Senator Williams stated his belief that there is no evidence that any harm would come to the Mattaponi River and that with the river as a drinking water source, the contrary is assured. He also expressed his concern about the federal role in this process. He stated that local elected officials from five jurisdictions support the project, the state has granted a permit, and the Governor, state health department and various state agencies all support this project. He asked how the federal government would ignore these policy decisions and those accountable for the best interests of Virginia's citizens? He cited Corps approval of other projects in Virginia and other states with more impact on wetlands and geographic regions than the proposed reservoir with fewer regional benefits and long-term water supply potential the details of which are contained in an August 1999 RRWSG report. Senator Williams expressed his strong objection to my Record of Decision and his intent to actively advocate a reversal of my position at the next level of federal review. He believes that if the claims of opponents are fairly examined and held to the same standards as the reservoir applicants, he does not doubt that approval of the permit will follow.

Senator Williams is correct that the Governor, the Virginia Department of Environmental Quality and the Virginia Department of Health have written in support of the project, however, I have not received any letters from other state agencies that express support for the project. On the contrary, as stated in the

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RROD, I have received letters from the Virginia Department of Game and Inland Fisheries (14 July 1997) and the Virginia Department of Conservation and Recreation Division of Natural Heritage (18 July 1987) expressing concern for the impacts of the project and making recommendations to lessen those impacts. Many of the state laws and regulations, as well as the roles of the state agencies are different from the federal laws and regulations and the federal role in the permitting process, therefore, state and federal conclusions are also potentially quite different. The RRWSG's comparison of the proposed King William Reservoir project to permit decisions by other Corps Districts was discussed on page 176 of the RROD: "As each project has its own unique need, environmental impacts, socioeconomic issues, agency concerns and project alternatives, such a comparison of different projects, both between and within districts, is a futile and irrelevant exercise. The Norfolk District has considered the King William Reservoir permit application on its own merits, and in accordance with regulation, has compared it only to appropriate alternatives to the proposed action and not to past projects, even if they were similar." All comments, whether supporting or opposing the reservoir, have been taken into consideration and all have received the same level of review in my evaluation of the project.

o. Comments Received on the RROD from Local Government Officials:

(1) City of Poquoson: In a letter dated 2 April 2001, Poquoson Mayor Gordon Helsel and other City officials expressed their disappointment over my recent denial of the permit for the King William Reservoir. He stated that the City of Poquoson had been a long-standing supporter of the project and he urged me to reconsider my denial of the permit. He stated his belief that the Peninsula needs the King William Reservoir as a water resource if they are to continue to grow and prosper, attract new business, expand existing businesses and allow families to remain there and thrive. Mayor Helsel listed ten reasons for his position (in wording almost identical to the suggesting wording contained in the Newport News "Call to Action Water Alert" bulletin discussed above) and included a City Council Resolution in support of the King William Reservoir Project.

(2) James City County: In a letter dated 30 April 2001, James City County Administrator, Sanford Wanner urged me to reconsider my decision to deny a permit for the King William Reservoir project. He indicated that James City County has been pursuing a long-term reliable surface water supply for twenty five years (including the vetoed Ware Creek Reservoir) and will continue to be at risk through continued dependence on diminishing groundwater resources. He also attached a resolution adopted by the James City County Board of Supervisors urging approval of the King William Reservoir project.

(3) York County: In a letter dated 30 April 2001, York County Department of Environmental and Development Services Director, John Hudgins wrote strongly disagreeing with the conclusions in my recommended Record of Decision. Mr. Hudgins stated his belief that the project would benefit hundreds of thousands of citizens with less economic and environmental impact than if the individual municipalities solved their own water supplies over the same time frame, although he did not indicate how this could be accomplished. He indicated that dependence on groundwater sources is becoming more expensive and uncertain for both the County's small water utility and their citizens on private wells. He cited increasing regulatory pressures, drawdown of aquifers and degrading water quality as reasons that the County joined the Newport News Waterworks distribution system. He requested that I reverse my decision or if not possible, that I provide documentation of the detrimental impacts my decision will have on the region's future water supply if my assessment of the RRWSG's water needs is wrong. On page 199 of the RROD, I acknowledged the cost to the RRWSG if my assessment is wrong. I am

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convinced, however, that denial of the King William Reservoir would not result in detrimental impacts to the region's future water supply.

In a letter dated 2 May 2001, York County Planning Commission Chair, Spencer Semmes, wrote to express the Commission's strong support for the King William Reservoir. He stated his belief that the Virginia Peninsula is in dire need of a regional raw water source capable of meeting the needs of their communities well into the next century. He indicated that through the County's contract with the City of Newport News, the King William Reservoir project would secure a long-term water supply for the County's projected population growth and enable the County to provide a uniform water supply to the remainder of the upper County not currently served by Newport News Waterworks. He stated that the Commission believes that the RRWSG has sufficiently addressed the environmental and cultural issues and that the reservoir would enable the Peninsula to meet the long-term water needs of both the citizens and businesses necessary to sustain their economic well-being. He expressed his hope that the Corps of Engineers will ultimately recognize the need for this project and approve the RRWSG's permit application.

Also, as an attachment to an e-mail message dated 3 May 2001, the York County Industrial Development Authority forwarded a resolution in support of the King William Reservoir.

(4) New Kent County: In a letter dated 23 April 2001, Julian Lipscomb, Chairman of the New Kent County Board of Supervisors wrote to inform me that although in 1994 New Kent County did not have plans for utilizing the 1 mgd of water reserved for them in the reservoir storage, they have since approved the 3,200-acre Kentland Planned Unit Development in the vicinity of the Diascund Reservoir which is currently served by groundwater sources. He indicated that it would be beneficial to the County to have the 1 mgd allocated in the reservoir project, as well as any additional water available to assist in removing the demands placed upon the groundwater aquifer by the Kentland Planned Unit Development. This new information has been incorporated into my final RROD in Section 8 a. - Water Supply and has been considered in my review.

(5) City of Portsmouth: In a letter dated 9 April 2001, Daniel Stuck, City Manager of the City of Portsmouth expressed his support for the King William Reservoir and encouraged me to reconsider my decision and approve the project. He said that in his former position as County Administrator for York County, he was intimately involved in the planning process that resulted in the King William reservoir project being named as the Peninsula's preferred solution. He stated his belief that the FEIS declared the King William Reservoir as the "least environmentally damaging practicable alternative" and it was, therefore, permissible. He expressed his concern that so much time, effort and public funding has been expended since the FEIS without more success.

The applicant performed a "practicability analysis" to screen alternatives for fatal flaws to narrow down those alternatives to be carried forward for further review. Although the RRWSG identified the King William Reservoir as a practicable alternative in FEIS, it was not declared by the Norfolk District to be the "least environmentally damaging practicable alternative." As stated on page 88 of the RROD, only through the Corps of Engineers application of the 404 (b)(1) Guidelines can such a determination be made. This analysis was not presented in the FEIS because it was not conducted until near the end of public interest review. On Page 191 of my 20 March 2001 RROD, I have stated that the King William Reservoir project does not represent the "least environmentally damaging practicable alternative" as other

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practicable alternatives to the proposed discharge that would have less adverse effect on the aquatic ecosystem are available to the applicant.

(6) City of Chesapeake: In a letter dated 4 May 2001, Chesapeake City Manager John Pazour expressed his concern for adequate safe drinking water for the citizens of Hampton Roads and for the area's ability to attract new business and expand existing businesses.

(7) City of Virginia Beach: In a letter dated 4 May 2001, Virginia Beach City Manager James Spore commented that by formal resolution of the Virginia Beach City Council, Virginia Beach supports the construction of the King William Reservoir and urged me to reconsider my previous decision and issue a permit for the project. Mr. Spore stated that the topography and hydrology of the Hampton Roads area create serious constraints which make it more difficult from engineering, economic and environmental perspectives to develop water supplies than in areas outside the Coastal Plain. He stated that this puts the region at a disadvantage when competing for quality economic development opportunities. He commented that "While permitting agencies may feel that the best way to proceed is to gradually meter out a number of small water projects so that supply just matches growing demand, the private sector would simply view this as a perpetual pending water shortage."

Mr. Spore stated his belief that the EIS had indicated that the King William project should be permitted and that that EPA was arguing in court that James City County's Ware Creek project should not go forward because the King William Reservoir was the environmentally superior project.

EPA's position regarding the Ware Creek Reservoir was that its impacts were unacceptable and that the Peninsula's regional water needs should be addressed through a regional solution or solutions, as opposed to a separate solution for each political subdivision. EPA did not, and has not, endorsed the King William Reservoir as that solution.

Mr. Spore stated that if Newport News cannot develop a reliable surface water supply, they will probably be forced to develop more groundwater. Mr. Spore indicated that Hampton Roads has been designated by the State as a groundwater management area and that the aquifer system cannot sustain large-scale municipal demands. As outlined in the RROD, I have not encouraged additional development of groundwater sources and I do not believe that additional groundwater sources other than those already identified by Newport News Waterworks and James City County would be required to meet the regional need. Page 150 of the RROD states.... "It should be emphasized that the District is not advocating the additional use of groundwater to supply the region's need unless it is determined by the state to be appropriate. The District recognizes that over-reliance on groundwater resources can result in depletion of aquifers, land subsidence and the disappearance of wetlands that are supported by those aquifers." I have identified in Sections 7 and 10 of the final RROD other ways to calculate safe yield to avoid the need for a new water supply until the year 2020; as well as a number of alternative water supply sources available when the actual need for additional water supply arises.

(8) City of Suffolk: In a letter dated 11 April 2001, Suffolk City Manager, Myles Standish wrote to inform me of his belief that the District's position on the King William Reservoir project does not assist the region's ability to provide a long-term solution of safe potable water to meet the needs of existing and future development. He stated his belief that denial of the King William Reservoir project not only impacts the customers of the City of Newport News system, but also has an impact on all of the Hampton Roads jurisdictions. The City of Suffolk currently depends on existing groundwater supplies to

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meet their demands, and anticipates additional supplemental groundwater withdrawals to meet future demands. Without the King William Reservoir project, Mr. Standish believes that Newport News will need to request additional groundwater permits for substantial withdrawals. He stated the City of Suffolk's support for the King William Reservoir project and requested the Corps of Engineers to reconsider the current position.

(9) Isle of Wight County: In a letter dated 9 April 2001, Henry Bradby, Chairman of the Isle of Wight County Board of Supervisors indicated that the Board of Supervisors had adopted a motion expressing its opposition to the District's recommended denial of a permit for the King William Reservoir. He indicated his belief that the development of the King William Reservoir is essential to sustainable economic growth and development on the Peninsula. He urged me to reconsider my recommendation to oppose this important regional project.

19. Summary of Public Comments Received on the Environmental Impact Statement and on the District's Recommended Record of Decision: The King William Reservoir project has engendered enormous controversy and public opposition ever since it was identified as the RRWSG's preferred alternative. While only approximately 100 letters were received in support of the project, approximately 4,315 letters and postcards and 12 petitions (with 1,792 signatures) were received from the public expressing opposition to the project. All letters received from the general public were reviewed and all comments were given full consideration in my recommended Record of Decision. On 30 April 2001, the North Atlantic Division forwarded to the District 246 public comment letters that they had received on the King William Reservoir (all are dated before the publication of the RROD). One of these letters expressed support for construction of the King William Reservoir. The remaining 245 letters expressed opposition to the project (244 letters and 1 petition with 82 signatures). The District has reviewed these letters and has found them to be very similar in content to other letters already in the District's file. No new information relevant to my recommendation was contained in these letters. The level of public involvement and scrutiny of the project has been extremely high. Environmental groups active in the Chesapeake Bay region including the Sierra Club, the Chesapeake Bay Foundation, and the Southern Environmental Law Center, as well as a local conservation organization, the Mattaponi and Pamunkey Rivers Association, have presented an informed opposition to the project based largely on the wetland impacts and impacts related to withdrawals from the Mattaponi River. Several of these groups, as well as the King and Queen County Board of Supervisors, hired their own experts and provided substantive comments on numerous aspects of the project, notably the applicant's need for the water and the validity of the salinity study. The District's re-evaluation of the water need issue was prompted by these highly technical critiques of the RRWSG's methodologies. Some of the fiercest opposition to the King William Reservoir came from the citizens of King William County and King and Queen County, many of whom formed a grassroots organization against the project called the Alliance to Save the Mattaponi. Many of these citizens perceive the reservoir and withdrawal as the City's attempt to take their land and water. The proposed reservoir is located approximately 50 miles from the lower Peninsula communities it would serve.

The public expressed concerns very similar to those of the District, the federal advisory agencies and state agencies on such issues as alternatives, need for the water, impacts to cultural resources and traditional cultural properties, anadromous fish, water quality, wetland impacts, fish and wildlife impacts, mitigation and environmental justice. The public also identified a number of other pertinent issues which are either addressed in this section or in other sections of this document. Other issues not pertinent to my recommended decision have not been individually addressed. Comments from the public brought to the

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attention of the District several factual errors, omissions and instances of conflicting information and pointed out where inadequate or outdated information had been used in the EIS. In general, the public commented that the project would result in significant and uncompensated impacts to natural resources in the Cohoke Valley and the Mattaponi River. Impacts associated with the City of Newport News' plans for potential future expansion of the King William Reservoir were also of great concern.

King William County: As the reservoir would be located approximately 50 miles from the lower Peninsula communities it would serve, many citizens of King William County felt the City of Newport News is wrongfully taking their land and their water, leaving little water for future development needs within the watershed. Because the project does not reflect watershed based planning, the citizens fear that the proposed withdrawal would effectively preclude other jurisdictions and riparian owners from using the Mattaponi River as a water source. This is especially of concern during periods of dry weather, when they fear the proposed withdrawal schedule would transfer all surplus water over the minimum instream flow to the Lower Peninsula, leaving little or none for use of Mattaponi watershed farmers and residents. This would force more reliance on groundwater wells which may themselves prove inadequate during dry periods. Also, because they believe that DEQ will not permit any significant discharges into the river for a distance of 5 miles of the intake, they fear that future development on the River could be substantially affected.

Some citizens are concerned that anything that will affect regional groundwater would affect their residential wells. An alteration of the existing groundwater flow velocity pattern and an increase in lateral seepage due to the rise in the water table is anticipated; however, the exact effects on residential wells have not been investigated. Many citizens commented that the project would be counter to the intent of the Chesapeake Bay Act, and would destroy the potential for Federal Scenic River designation. As many crops cannot tolerate brackish water, several farmers who irrigate their crops with water from the Mattaponi River expressed concern over the threat of salinity intrusion.

Native Americans: Comments received from the Mattaponi Tribe, the Pamunkey Tribe, the Upper Mattaponi Tribe, the Virginia Council on Indians and the United Indians of Virginia have expressed opposition to the project from the unique perspective of Native Americans. In addition to citing many of the same environmental concerns expressed by environmental groups and the general public, the Native Americans objected to the project because of its impacts to their culture and livelihood. The Mattaponi Tribe believes that their subsistence shad fishery and hatchery would be lost or irreparably harmed and that their culture, traditional practices and way of life would be adversely affected by the project. The Pamunkey Tribe expressed concern over the loss of cultural resources and disturbance to Native American burial sites. These tribes have used the rivers and surrounding land of Pamunkey Neck for centuries and derive from them not only food, but also socioeconomic benefit and their spiritual identity.

The Mattaponi Tribe also believes that the Treaty of 1677, which ceded the Pamunkey Neck to the Native Americans, would be violated by the construction of the reservoir in Cohoke Creek. The Mattaponi Tribe claims that since one arm of the reservoir would encroach within 3 miles of their reservation, it would be in violation of the articles of peace which provided for a cessation of English confiscation of Indian lands and established a 3-mile buffer zone around all Indian towns to separate the colonists from the Indians. A portion of the pipeline route would also fall within 3 miles of the Pamunkey Reservation. In a letter dated 3 June 1997, the Virginia Attorney General stated his concurrence with the RRWSG's contention that since the need for the buffers ceased years ago, it was no longer pertinent. Also, other non-Indian properties already exist within the 3-mile buffers. For over 350 years, the Tribes have presented their

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yearly payment of taxes or “tribute” of beaver pelts, wild turkey and deer to the Governor of Virginia at Thanksgiving in accordance with the treaty. The Tribes feel that they have honored their commitment, but by issuing the DEQ permit for the construction of the King William Reservoir, the Commonwealth of Virginia has not kept its pledge.

It is important to note that these are not federally recognized tribes, although they have been seeking that status. The Treaty of 1677, made with King Charles II of England, is held by the Commonwealth of Virginia, not by the federal government; therefore, any Corps permit decision could not violate the treaty. However, the Norfolk District has made every effort to keep the Tribes informed and to involve them where appropriate and has treated the tribes as though they were federally recognized to the extent allowed by applicable statutes and regulations.

Letters were received commenting on the RROD from the Pamunkey Tribe and the Institute for Public Representation on behalf of the Mattaponi Tribe (see below) as well as from numerous individuals who identified themselves as members of the Mattaponi Tribe or as American Indians.

King and Queen County: In letters dated 29 April 1997 and 18 July 1997, the King and Queen County Board of Supervisors commented that the proposed reservoir does not represent a “regional approach” with “the greatest cumulative benefits and least overall impacts within the region” as claimed by the RRWSG. Instead, it would greatly benefit the lower Peninsula region at the expense of the middle Peninsula region. The County stated that the project fails to take into account the future needs of King and Queen County in terms of agriculture, industry, commerce, recreation and residential development. King and Queen County also provided two independent critiques of the applicant’s salinity study that questioned its validity, and applicability to the river system. Furthermore, the County disputes the RRWSG’s reported location of the boundary between King William County and King and Queen County on the river and claims that the withdrawal structure would be located within King and Queen County. As such, they believe they should have been considered as a host community for the withdrawal.

Caroline County: In a letter dated 25 July 1997, the Caroline County Board of Supervisors stated their opposition to the King William Reservoir because it would restrict their ability to obtain their “fair share” of water from the Mattaponi River. They commented that the applicant used a 10-year old study which no longer accurately reflects Caroline County’s consumptive needs to determine how much water Caroline County would need in the future. They feel that groundwater systems in the County will be inadequate to meet their demand within the next few years and predict that by 2014, they will need their own surface water source to meet their demand. They are also opposed to wetland mitigation sites being located in Caroline County for a project that is of no benefit to the County.

Dr. John B. Dawson: Dr. Dawson wrote on 22 July 1997 that new developments in the Virginia Department of Health policy allows wastewater recycling for potable uses by indirect recharge. Dr. Dawson commented that Tertiary treatment to render wastewater fit for drinking is being accomplished at the Occoquan Reservoir in Northern Virginia and could be done here as well. Therefore, Dr. Dawson suggested that Newport News should consider alternative 28 should be considered as a viable alternative. He believed that treatment plants in Henrico, Hanover and Williamsburg could potentially be re-fitted to provide tertiary treatment. According to the Virginia Department of Health, advanced treatment of existing raw and treated sewage discharges into the Occoquan Reservoir was determined to be economically superior to transporting the treated effluent out of the watershed area as a way to protect

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public health. This was a solution to an existing water quality problem rather than a means of providing additional water supply.

In a letter dated 29 July 1997, the Virginia Department of Health stated their position for developing any new water supply, "When developing new sources of water supply, use the highest and best source (combination of highest quality and best quantity) first." Based on this principle, the Health Department would be opposed to direct recycling of reclaimed wastewater as an immediate water source. Indirect recycling where reclaimed wastewater is discharged into a natural system to provide dilution and detention (i.e., the discharge is separated from the intake in time and space) would be recommended only after all other alternatives are examined and indirect recycling is determined to be the highest and best source available. The Health Department stated that they would, therefore, not automatically reject the concept of indirect recycle, but would evaluate each proposal on a case specific basis. The Department did not support the applicant's Alternative 28, as it would not provide sufficient dilution and detention. However, they indicated that they would evaluate any other indirect recycle scheme provided sufficient details are available.

During a 15 August 1997 meeting between the District, the Virginia Department of Health, the Virginia Department of Environmental Quality, the Hampton Roads Sanitation District and Newport News Waterworks, alternatives for indirect recycling were discussed and the District requested that the RRWSG provide the necessary information necessary for the Health Department's consideration. Accordingly, the RRWSG considered two possible locations for treated wastewater discharge (upstream of Diascund Reservoir on Diascund Creek or Beaverdam Creek, or upstream of Walker's Dam on the Chickahominy River) to benefit the Newport News Waterworks raw water supply system and provided an analysis indicating that such a project would not be able to provide a long enough hydraulic retention time within the receiving waterway (according to current California guidelines for similar projects). As the Health Department would likely impose more stringent blending ratios to compensate for the low retention time, the RRWSG calculated that the safe yield would be reduced to 8.5 mgd and the costs per safe yield benefit would exceed the RRWSG's affordability criterion. As other sources of potable water are clearly available to the RRWSG, this concept would probably not be considered acceptable by the Health Department. Therefore, the District did not require further consideration of this alternative, but continued to encourage wastewater reuse as an additional conservation measure.

Mr. Howard Potter: While not opposed to the reservoir project, Mr. Potter wrote on numerous occasions of his concern that the continued withdrawal of groundwater would contribute to the subsidence of shorelines and wetlands in the Chesapeake Bay watershed. He also provided much historical documentation of the continued occupation of Pamunkey Neck by Native Americans.

Public Comments Received on the RROD: A total of approximately 4,265 written comments were received in response to the RROD. These comments were submitted by U.S. mail, electronically by e-mail and facsimile or were hand delivered to the District. Approximately 502 comments were received in support of the project (397 letters, 75 postcards and 30 e-mails) and approximately 3,757 comments were received expressing opposition to the project (1,674 letters, 2,011 postcards, 64 e-mails and 6 petitions with 140 signatures and 2 newspaper clippings with comments written in). Six letters that stated neither support nor opposition to the project were also received. In addition, a long blue cloth covered with paper fish signed by many school children was submitted in opposition to the project. These numbers include all comments received on the RROD. Comments from federal, state and local officials, the applicant and

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their consultants and employees are addressed in other sections of the Final RROD, as appropriate. Comments from the general public are addressed in this section.

These comments included letters from private citizens, environmental groups, businesses, clubs, civic organizations, and special interest groups. General public comments are either addressed in this section or in other sections of this document by subject. All comments received from the general public were given full consideration in my final recommended Record of Decision. Issues not pertinent to my final recommended decision have not been individually addressed.

The majority of the comments were submitted in form letters, post cards and letters following general formats either suggested by the project proponents or the opponent groups. These letters contain very general comments, and individual commenters are not listed here. (A separate listing of the names and addresses of all commenters is contained in the administrative record for this project.) The public generally commented on the issues outlined in the RROD (need, wetlands, cultural resources, traditional cultural properties, environmental justice, anadromous fish, water quality, alternatives, fish and wildlife, and mitigation). Many of the general comments from those opposing the King William Reservoir follow suggested formats of opponent groups such as the Sierra Club, the Chesapeake Bay Foundation and the Mattaponi and Pamunkey Rivers Association. Supporters of the King William Reservoir project have also submitted form letters and post cards that reflect suggested comments from the City of Newport News' "Call to Action Water Alert" and from a series of newspaper advertisements by the Peninsula Pro-Water Coalition that ran in the Peninsula's Daily Press.

a. Comments Received on the RROD in Favor of the King William Reservoir Project: Many supporters of the King William Reservoir have submitted form type letters and postcards that reflect the suggested comments in the City's "Call to Action Water Alert." The four page Water Alert was sent out to an unknown number of residents by Newport News Waterworks and was posted on their web site. It asks recipients to write to me and to their elected officials, using specific points listed in the mailer. The letter states that "without this vital new water supply we have no assurance of an adequate long-term drinking water supply for the future-for our children and for our grandchildren." Specific points provided by Newport News for potential commenters include: multiple studies have confirmed that the volume of water sought is needed, that the river and environment would not be impacted, that the wetland mitigation plan would more than compensate the losses, that the project will improve the Chesapeake Bay watershed by preserving 6,400 acres of land, that the reservoir would not violate the treaty with the Mattaponi Tribe or harm the Indians, and other water supply alternatives are not feasible and are too costly. Comments very similar to comments submitted by City of Newport News officials and RRWSG consultants are addressed in RROD and not repeated in this section. Letters expressing support for the project from State and local governments and from City of Newport News officials and employees and RRWSG consultants are discussed in Sections 18 and 20.

General Comments: Some supporters of the King William Reservoir expressed a great deal of emotion concerning my recommended decision to deny the reservoir project. Some made derogatory remarks or personal attacks on my staff and me, or accused my staff and me of imposing our personal beliefs on the decision and deceiving the applicant.

- The decision to deny is based on emotions, including sentimental reasons involving the American Indians
- Long-range planning for water supply is good; long-term water supply is essential to continued

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health of Peninsula's economy

- State approved the project - the Corps should do same, rather than substituting its judgment for the state's
- Arguments against reservoir reflect desires of a small group of over zealous environmentalists
- Newport News will monitor pollution in Mattaponi River and protect water quality because degradation would cause water treatment problems
- Groundwater supply may not be adequate; King William Reservoir best of 35 alternatives
- Economic health and quality of life of the Virginia Peninsula is at risk, water is needed for continued growth, quality of life, gardens
- The decision is arbitrary and short-sighted, premature and ill-advised, does not represent fair and equal treatment
- Needs of the many should be considered over those of a few Indians; impacts to the Indians are inaccurate, overstated and based on emotion
- This is similar to the California power crisis
- There is no evidence that the project will result in harm to river or Mattaponi Tribe and the reservoir is the best way to protect the environment
- This decision does not reflect the same criteria or standards as in recent Corps decisions
- The decision represents a dramatic shift in thinking over six-month time frame. The District changed its position for denial from water need to impacts to Indians

Specific Comments in support of the King William Reservoir were received from the following. Unless indicated otherwise, comments in these letters are addressed in the Final RROD.

Virginia Peninsula Chamber of Commerce
Newport News Industrial Development Authority/Economic Development Authority
Williamsburg Community Builders Association
Greater Peninsula Now, Inc.
Jack L. Massie Contractors, Inc.
Loretta Gray
Karen Rice
Deborah Morris
Joseph Landrum, P.E.
Howard Potter

Specific comments (selected):

(1) Greater Peninsula Now, Inc.: Letters were received from the President and Vice President of this organization, which is comprised of "approximately 36 business and civic leaders on the Peninsula." They object to the District's decision and complain that the District has dismissed years of local planning and scientific studies. They believe that policy determinations on water shortage risks should be made by state and local entities, and contend that the decision is based on my personal desire to protect the Indians, not the "obvious need" for water. They stated that my conclusion that project would harm the tribes is not supported by VDHR, and that I inappropriately terminated the Section 106 consultation process. They assert that the decision gives a lot of weight to the cultural values of a small Native American community but give little or no consideration to the adverse effects on a much larger minority and low-income community on the Peninsula. They stated that a permit denial will do enormous harm to the economic well being of the entire Peninsula region, in particular the "poor and disadvantaged."

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(2) City of Newport News Industrial Development Authority/Economic Development Authority: The Vice Chair of the Authority, Allen Jones, wrote that adequate and affordable water is very important to the well being of the region. He also commented on the environmental justice evaluation that I conducted, which he believes emphasizes the concerns of Native Americans at the expense of other minorities. He objects to my decision and what he perceives as the “lack of adequate review, and lack of balance that your flawed analysis reflects.”

(3) Western Tidewater Water Authority: In a letter dated 11 April 2001, Chairman Dana Dickens and Vice-Chairman Robert Claud of the Western Tidewater Water Authority of the City of Suffolk and Isle of Wight County, wrote expressing their opinion that denial of the King William Reservoir project will have far-reaching impacts to the economic well-being of the region. They strongly believe that the King William Reservoir project will enable the region to utilize both its surface and groundwater resources in the most environmentally prudent fashion to provide for its long-term water supply. The Western Tidewater Water Authority strongly encouraged the Corps of Engineers to reconsider the recommended denial of the project.

(4) Hampton Roads Planning District Commission: Comments were received from the Hampton Roads Planning District Commission (HRPDC), dated 18 April 2001. These comments are accompanied by a letter from HRPDC to the City of Newport News, dated July 15, 1999, which addresses population projections for the lower Virginia Peninsula. HRPDC stated that the Peninsula needs additional water supply if it is to remain economically viable and urges the Corps of Engineers to approve the King William Reservoir project. HRPDC stated that population projections prepared for the RRWSG are consistent with those prepared by HRPDC, which are also closely correlated with regional forecasts. They stated that the RRWSG has followed state laws and regulations, and HRPDC has serious concerns about the position taken in the RROD that the COE cannot consider state requirements in the balancing of other public interests. HRPDC objects to the premise that citizens should greatly restrict their water consumption involuntarily. HRPDC also questions the long-term viability of groundwater as a source of potable water for the Hampton Roads area.

(5) Deborah Morris: Ms. Morris’ letter expressed “outrage about the permit process as imposed by the Norfolk District,” accused the District of misleading the applicant and impeding the process; being “everything but unbiased,” giving preferential treatment to claims of the Sierra Club and Indian tribes, and concluded that “the Norfolk District has failed miserably in implementing its mission.” She claims that the Norfolk District has ignored or discounted reports and studies that it required of the applicant, despite the fact that the consultants who prepared them are state and nationally recognized experts, and that the District has disregarded the guidance and regulations of the Virginia Department of Health. She asked that the project be reviewed by someone who will take a “fair and reasonable approach.”

(6) Loretta Gray: Ms. Gray’s letter stated that she fully supports the King William Reservoir project. She asserts that professional and scientific studies that differ from the District’s opinion have been ignored, and the RROD portrays the worst case scenario. She stated that alternative water sources cited in the RROD are not realistic and the District has ignored the recommendations of the Virginia Governor and state agencies.

(7) Karen Rice: Ms. Rice submitted comments on a variety of topics including insufficient natural gas exploration, pollution and the need for long term planning for water needs on behalf of her children and grandchildren. She stated that the reservoir project is a regional solution to water needs and

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that, without it, the region will suffer “severe water restrictions,” which will cause increased suburban sprawl and its associated environmental damage. She stated that the proposed reservoir is the least damaging alternative and that it would result in a net gain of wetlands. She also compared this project with another reservoir project approved by the Corps of Engineers in North Carolina and dismissed the alternatives discussed in the RROD as impractical. She commented that the project would not directly affect the neighboring Indian reservations, and would have no impact on shad fishing. She thinks, “too much leeway has been given to their (Mattaponi and Pamunkey Indians) tale of woe”...and “they seem to think they own the water in the Mattaponi River.” She concludes that the majority of people in the region support the project, including the elected officials.

(8) Joseph A. Landrum, P.E.: Mr. Landrum expressed his strong support for the RRWSG and the King William Reservoir project. He stated that the Peninsula will need additional water supply, and that the project would not result in irreparable harm to the environment, as the project would add “open water wetlands that will provide excellent fresh water fishing and recreational opportunities” and would replace more wetlands than are destroyed. He contends that Newport News Waterworks has actually benefited the Native Americans in King William County by researching artifacts and history of the area, and that the project would also benefit economically disadvantaged people throughout the Peninsula by providing higher paying jobs. He concludes that the elected officials in the region know better than I what is best for the Peninsula.

b. Comments Received on the RROD in Opposition to the King William Reservoir Project:
General comments of those opposing the King William Reservoir: The public expressed concerns very similar to those outlined in the RROD. Many were offended by Newport News’ “marketing campaign” published in the Daily Press and by the newspaper’s editorial comments. Many of the comments expressing opposition to the reservoir are similar in content to post cards, e-mails and letters submitted by the Sierra Club, Chesapeake Bay Foundation and Alliance to Save the Mattaponi. These comments include: Newport News has failed to demonstrate need for the water and can meet its water supply needs through less damaging water supply alternatives; the project would result in loss of more than 400 acres of wetlands; the project would harm Native Americans and violate treaty rights.

- Agree with recommended decision to deny reservoir project
- The reservoir and water are not needed. Newport News’ claims of future water needs are exaggerated; their previous projections for water need in the year 2000 made over ten years before were substantially inflated and the need never materialized
- Mattaponi River water should go to local community, water should not be taken away from frugal natives
- The people of King William County do not support the reservoir
- Violation of rights of the Mattaponi Tribe; The Tribe would be irreparably harmed; the project would result in adverse impacts to the traditional way of life of the Indians and a broken treaty;
- Project is short-sighted, based on greed, will involve selling water to others; Newport News Waterworks does not need this water for current customers
- There is political pressure to approve of project
- The real reason for the project is to support development
- Governor Gilmore says he supports restoration of the Chesapeake Bay, but his action on King William Reservoir is not consistent with Chesapeake Bay restoration efforts
- Newspaper advertisements and articles contain incorrect information, such as the decision was

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made based on number of comments for or against project; Newport News has bombarded public with fear, innuendo and distorted facts about water need

- The District has carefully researched the issues and made their determination based on input from all parties, consultants and agencies
- The project would result in irreversible damage to the environment and unacceptable cumulative environmental impacts; the wetland mitigation plan is inadequate; damage to the environment cannot be mitigated; the proposed instream flow method is not sufficient to protect anadromous fish, wetlands, threatened species or water quality
- One commenter is opposed to the concept of artificial wetland creation. Functions of natural wetlands cannot be reproduced; too many unknown and misunderstood variables to provide confidence in results
- During a drought situation a couple of years ago, lower peninsula residents were not asked to reduce consumption. Instead, it was reported that there was an abundance of water (reservoirs were at 92% storage); Newport News wastes water even during longest dry spells (two newspaper articles are cited)
- According to NNWW 1998 water needs study, water quality in existing reservoirs has not been protected. Runoff from highways, high density development and a City owned golf course have not been mitigated through detention ponds or collection systems. Since NNWW has not protected existing water sources, they should not be given control over new water sources.
- Newport News has not considered or instituted conservation, growth management or desalination
- One Yorktown resident is outraged that so much tax money has been spent without public referendum or a survey of public opinion
- Another alternative is to use reverse osmosis, which is economically and technically feasible
- One commenter says residents of the service area are prepared to limit lawn watering and car washing if necessary
- Newport News suddenly found extra water when James City County was considering a desalination plant
- Elderly people on Indian Reservation obtain 40% of their income from shad fishing
- Indians received limited education during days of segregation and rely on fishing for their livelihood

Specific Comments in opposition to the King William Reservoir were received from the following. Unless indicated otherwise, comments in these letters are addressed in the Final RROD.

Sierra Club, Virginia Chapter
Chesapeake Bay Foundation
The Nature Conservancy, Virginia Chapter
Southern Environmental Law Center
National Audubon Society, Virginia Audubon Council
Georgetown University Law Center, Institute for Public Representation
Mattaponi and Pamunkey Rivers Association
Alliance to Save the Mattaponi
American Rivers
Mark Fowler, College of William and Mary Philosophy Department
National Association of Social Workers, Virginia Chapter

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Dr. Jim McClellan, Professor of History, Northern Virginia Community College
Dr. Donald Phillips, West Point Hunt Club
Michael Siegel and Dr. Thomas Muller, Public and Environmental Finance Associates
Chief William Miles and Assistant Chief Warren Cook, Pamunkey Indian Reservation
Dr. Linwood Custalow, Oral Historian, Mattaponi Tribe
Chief Webster Custalow, Chief, Mattaponi Tribe
Dr. Paul Jacobson, Langhei Ecology, LLC
Benjamin Turner, Environmental Systems & Technologies, Inc.
Portsmouth General Hospital Foundation
John Zeugner, American Institute of Certified Planners
Dr. Wesley Pullman
Thomas Rubino
Jessica Putnam Hughes
Bradford Worthington
Deborah Revere Beuchelt

Specific public comments (selected):

(1) The Nature Conservancy: The Nature Conservancy expressed their support for the District's RROD and outlined their participation in the development of the District's Mattaponi River monitoring plan. They commented that the potential stresses from changes in timing, duration and frequency of freshwater flows; increased salinity; and altered sedimentation patterns are each likely to impact the sensitive joint-vetch. The Nature Conservancy expressed their "...grave concern regarding the impacts of this water withdrawal on a system which, to date, has incurred very little alteration in its natural flow regime." They stated that they would prefer that impacts to the 400 acres of wetlands, bald eagle, and small whorled pogonia be avoided. The Nature Conservancy stated that they are unable to support the development of a non-essential water withdrawal project with such undeniably significant environmental impacts.

(2) National Audubon Society, Virginia Audubon Council: Virginia Audubon expressed their support for the District's RROD and stated their determination that the proposed reservoir would cause serious population declines in twenty-three bird species designated by the Partners In Flight as mid-Atlantic Coastal Plain conservation priorities. The Virginia Audubon Society noted that neotropical migrants, which they have observed and assumed to be nesting at Cohoke Creek, would suffer major population declines if the reservoir were built. They indicated their concern that the management measures recommended by the Service and the VDGIF had not been included in the applicant's plan. They disagree with the RRWSG's claim that the natural resources in the area would be improved by the reservoir and outlined their concern for the destruction of habitat for amphibians, terrestrial reptile and mammals, dragonflies and butterflies, shad and other native fish. They commented that land conversions and disturbance brings in nuisance species such as brown-headed cowbirds, European starlings, summer-resident Canada geese, American Crows and pet cats and dogs. The Audubon Society stated that the wetlands and uplands of Cohoke Creek are an "...unusually intact, ecologically valuable and strikingly beautiful riparian ecosystem."

(3) Tom Rubinio: Mr. Rubino commented on impacts to the sensitive joint-vetch from the proposed reservoir project and enclosed a 1998 and 1999 field monitoring report prepared by Rouse

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Environmental Services, Inc. that documented both qualitative and quantitative data on sensitive joint-vetch populations on the Mattaponi River.

(4) Donald Phillips, Ph.D.: Dr. Phillips submitted comments on the RROD on behalf of the West Point Hunt Club, Inc., along with a detailed review of the applicant's studies on water need. He supports the conclusions stated in the RROD, and his review indicates that the area has more water available and less probability of shortages than claimed by the applicant.

(5) Michael L. Siegel and Dr. Thomas Muller: Dr. Muller and Mr. Siegel reviewed HDR's Lower Virginia Peninsula Regional Raw Water Supply Plan Water Needs Assessment and provided comments on behalf of the Sierra Club of Virginia. They found that the Needs Assessment has a number of shortcomings that result in its demand forecast being unreasonably high. They stated that while they are in general agreement with many of the RROD's and IWR's conclusions, IWR's demand forecast and the RROD do not fully address some of these issues.

(6) Bradford Worthington: Mr. Worthington noted that Newport News executed an agreement and memorandum of understanding with the King William Board of Supervisors while exploring alternatives with the federal agencies prior to submitting an application to the District. He alleged that Newport News may have submitted a "fraudulent and/or incomplete permit application" and believes that their failure to disclose "one or more material facts" needs to be investigated by appropriate federal authorities. Mr. Worthington is concerned that the federal agencies may have made critical decisions that would have been different had all of the facts been known. The District possesses sufficient information to make a recommended decision. As the District's current recommendation is for denial of the application, no investigation is presently warranted.

(7) The Virginia Chapter of the Sierra Club: The Sierra Club commented in support of my decision to recommend denial of the King William Reservoir project. Based on the reports of their consultants, Michael Siegel and Dr. Thomas Muller, as well as the comments submitted by Dr. Donald Phillips, the Sierra Club has concluded that Newport News significantly overstated the water requirements of the Peninsula and understated the current water supply. They also concluded that Newport News has failed to give reasonable consideration to alternative water sources and conservation measures. Two letters were submitted. Tyla Matteson, Conservation Chair of the Virginia Chapter of the Sierra Club stated that Peninsula water bills do not include a significant monetary incentive to conserve water use and water is considered a plentiful and inexpensive commodity. She referenced an article in the Daily Press that states "Newport News Waterworks...doesn't have its own water conservation program because it's not a pressing issue for the city, said Nancy Howard, water resources planner. Efforts are focused more on long-term water solutions, such as creating the King William Reservoir, Howard said." She stated that there are a growing number of local politicians who are opposed to the reservoir, as well as most (95%) of the residents of King William County. Ms. Matteson also discusses the harm to the Native American Tribes and environmental harm to the region. Glen Besa, Director of the Virginia Chapter offered comments in support of my decision to recommend denial of the permit. Major reasons cited for this support were: independent analysis revealed that water need is overstated, other alternatives are available to meet those needs, the project would disproportionately impact the Native American population of King William County, and the project would result in significant environmental impacts, including salinity changes in the Mattaponi River.

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(8) The Southern Environmental Law Center (SELC): SELC submitted comments on the RROD, dated 4 May 2001. SELC stated that environmental damage resulting from the project is so great that the permit should be denied on environmental impacts alone. They stated that the Mattaponi River and Cohoke Creek are highly valuable, pristine and productive ecosystems, and that creation or restoration of offsite wetlands would not compensate for the proposed losses. They believe that potential expansion of the reservoir would increase the amount of wetlands destroyed to over 600 acres. SELC also expressed concern about the potential impact to anadromous fish habitat and the salinity intrusion into the Pamunkey and Mattaponi Rivers. They agreed with the RROD that two threatened plant species would be affected by the project, as well as several other rare plants, and they mention potential impacts to bald eagle and great blue heron nesting areas. They questioned the RRWSG's intention of using the reservoir pool area to offset habitat losses because the deep water habitat created is not an important wildlife resource in this region and the reservoir could have adverse affects on local fisheries. SELC expressed concern that Newport News will seek changes in the withdrawal rates, as they have publicly stated that the Modified 80% Exceedence MIF rule is unacceptable to them, and this would increase impacts to the Mattaponi River. They stated that reduction of flows in Cohoke Creek would adversely affect the creek itself as well as the chemistry of the Pamunkey River. Regarding the salinity analysis, they believe that the model is not adequate to predict potential salinity changes in the Mattaponi River and that increased salinity would affect the Mattaponi Tribe's subsistence shad fishery and hatchery. They emphasized that the Pamunkey River shad hatchery may also be impacted, if the Pamunkey River pumpover is constructed. SELC pointed out that approximately 21,000 feet of the proposed pipeline route were not surveyed for historic resources. SELC also believes that the RRWSG has overstated the water demand and understated the supply, and believes that the water supply need can be met by alternatives with less environmental impact. SELC provided information that in 2000, the Virginia General Assembly amended the State Water Control Law to "promote and encourage the reclamation and reuse of wastewater..." and stated that this could be an important strategy for Newport News to reduce the need for freshwater. SELC also clarified a misstatement in the RROD (page 107) regarding the Circuit Court dismissal of Newport News' appeal of the VWPP. SELC recommended that the RROD also mention the recent court decision which provides standing for the Mattaponi Tribe and environmental groups to appeal the DEQ permit. SELC expressed concern about the monitoring plan and their belief that Newport News intends to expand the project, and that they did not comply with the NEPA process in good faith, as they had already selected their preferred alternative and have not given full consideration to less environmentally damaging alternatives.

(9) Chesapeake Bay Foundation (CBF): CBF submitted comments in response to the RROD, dated 4 May 2001. They stated that construction of the reservoir would injure their members, over 40,000 of whom live in Virginia. Accordingly, they support the recommendation to deny the application for the King William Reservoir project, as it would result in "unprecedented, significant, unmitigatable... adverse impacts to the York River watershed and the Chesapeake Bay." CBF stated that they contracted with four prominent university experts to provide independent, technical analysis of the Final Wetland Mitigation Plan submitted by the RRWSG. As a result, CBF found that the mitigation plan would not provide an in-kind replacement of the diverse wetland complex that would be impacted by the reservoir. CBF concludes that the mitigation plan would result in net loss of many important wetland functions. CBF also expresses concerns about the cumulative effects of water withdrawals from the York River system, the downstream release schedule for Cohoke Creek, the prospective second downstream dam site on Cohoke Creek and the recreational public park proposed for the Mattaponi River intake site. They expressed concern about both the Mattaponi River and Cohoke Creek flowby requirements and the City of Newport News' anticipated intentions to overturn them, as well as the reasonably foreseeable future

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enlargement of the reservoir and its associated impacts. They stated that King William County's plans to develop a park at the Mattaponi River intake site could impact the Federally listed threatened sensitive joint-vetch population in the vicinity. CBF expressed grave concern about the monitoring requirements and concluded that environmental monitoring is an inappropriate solution to compensating for the anticipated large-scale adverse effects of the King William Reservoir project. Finally, CBF stated that a decision to deny the permit application, which involves the "largest single destruction of wetlands...ever evaluated in the Norfolk District..." (RROD page 66), is supported by the Federal government's commitment under the 2000 Chesapeake Bay Agreement to achieve a "no net loss of existing wetland acreage and function."

(10) American Rivers: Ann C. Mills, Vice President for Conservation, wrote in support of my recommended record of decision. She stated her belief that the water is not needed, the environmental damage cannot be adequately mitigated and the Mattaponi Indian Tribe would be irreparably harmed through endangerment of shad spawning grounds, flooding of archaeological sites and violation of their 1677 Treaty.

(11) Pamunkey Tribe: Comments were submitted by the Pamunkey Indian Tribe on 2 May 2001. They stated their support for the recommendation to deny the permit application for the King William Reservoir and cited a number of specific concerns. The Pamunkey Indian Tribe is concerned about the adverse effect of the project on archaeological sites and the environmental justice issues related to the culture, economy, human health and social welfare of the tribes in Virginia. They stated that they are opposed to the reservoir, yet if permits are issued, they want the best mitigation plan possible, including development of a resource management strategy for the Mattaponi and Pamunkey Rivers. In particular, they are concerned about the loss of over 1,000 acres of forest land, including over 400 acres of wetlands, and that the wetland mitigation plan is inadequate. They stated that the "lowgrounds," or wetlands, form a significant part of the Pamunkey People's way of life and have traditional cultural and spiritual significance. They stated that the Habitat Evaluation Procedures (HEP) performed on the site do not adequately characterize the diversity and complexity of the system and that the adverse impacts of the project on shad, herring and rock fish are not adequately assessed. They conclude that the tribe cannot be compensated for the loss of spiritual, cultural and traditional practices that would occur as a result of reservoir construction and water withdrawal, including the prospective withdrawal of an additional 45 to 120 mgd from the Pamunkey River to supplement that taken from the Mattaponi River.

(12) IPR on Behalf of the Mattaponi Tribe: A letter was received from the Institute for Public Representation of the Georgetown University Law Center, dated 4 May 2001, enclosing the Mattaponi Tribe's comments on the RROD. The Mattaponi Tribe emphasized that the proposed King William Reservoir would have devastating effects on the Tribe and that they concur with the conclusion reached in the RROD. They stated that the project would irrevocably alter the Tribe's way of life, culture and would ultimately threaten its existence. Specifically, they believe it would endanger the Tribe's shad fishing and would harm its shad hatchery, would affect important native plants, and compromise the sanctity of the Tribe's religious ceremonies. The Tribe requested that the District revise the RROD to reflect the recent Virginia Supreme Court decision that the Mattaponi Tribe, among others, has standing to challenge the VWPP. The Tribe clarified that, although it withdrew from the Virginia Council on Indians campaign to obtain federal recognition, this does not indicate that it is no longer pursuing federal recognition. The Tribe disputes the assertion in the RROD that the Pamunkey Tribe represented the Mattaponi Tribe, and stated that the RROD should provide more detail on Dr. Cheslak's criticisms of Dr. Greg Garman's report on American shad. Finally, the Tribe recommended that the District add the 1677 Treaty at Middle

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Plantation to the list of selected references at the end of the RROD, as the treaty is a key document that guarantees tribal rights and prohibits the construction of the King William Reservoir. The 1677 Treaty at Middle Plantation had been listed among the selected references in the RROD under King of England. However, it has been correctly listed in the Final RROD under “Treaties.” The other issues have been addressed in the Final RROD.

The Tribe also requested that the RROD be amended to explain that the 1677 Treaty at Middle Plantation has the status of a federal treaty and the Corps’ issuance of this permit would violate that treaty. The Tribe asserts that the 1677 agreement, “like all other colonial treaties with Indians acquired the status of a federal treaty when the U.S. Constitution was adopted in 1789.” They stated that with the adoption of the constitution, the U.S. Government had assumed the responsibility of the State of Virginia to enforce the treaty's three mile buffer zone around the reservation.

Article VI, clause 2 of the U.S. Constitution states that “[a]ll treaties made, or which shall be made under the authority of the United States, shall be the supreme law of the land” (emphasis added). This clause and case law interpreting it recognize that treaties made by the United States under the authority of the Articles of Confederation would continue in force following adoption of the Constitution. The three cases cited by the Tribe fail to support their position which expands the reading of this clause. One case interpreted a treaty made under the authority of the United States and another involved lands outside the state in question. The final case, Catawba Indian Tribe v. United States, 24 Cl. Ct. 24 (1991) does state without citing any authority that the United States “became invested with all of the former sovereign's rights and obligations under the 1760 and 1763 treaties” when the U.S. became independent from Britain. This statement however, was merely dicta in the case and was not part of the holding or determinative of the outcome.

The treaty was executed in 1677 by Virginia on behalf of England and, therefore, was not executed under the authority of the United States. It is the opinion of the District that when sovereignty changed, any potential obligations under the treaty passed to the Commonwealth of Virginia. This opinion is consistent with prior positions taken by both the Mattaponi and the Commonwealth of Virginia. See, Mattaponi Indian Tribe v. Commonwealth of Virginia, 541 S.E.2d 920 (2000) and Deputy Attorney General of the Commonwealth of Virginia Frank S. Ferguson, “Memo re: King William Reservoir and the Mattaponi Indian Tribe” (June 3, 1997). The treaty does not appear on the U.S. Statutes at Large listing of Federal treaties. Further, the federal government has not recognized the Mattaponi Tribe as it has other tribes with whom it has treaties. As the District is recommending denial of the permit, any potential obligations under the treaty are not implicated.

(13) Chief Webster Little Eagle Custalow: Chief Custalow is the Chief of the Mattaponi Tribe. He submitted comments regarding the importance of the Mattaponi River to the Tribe, particularly the fishery, which is not only subsistence and income for them, but also represents the “last part of our living culture that we have left.” He stated that the wetlands that would be affected by the reservoir are the sacred grounds of the Tribe, which was once part of their reservation that was taken from them, and which they hope to some day retrieve.

(14) Dr. Linwood Little Bear Custalow: Dr. Custalow is oral historian of the Mattaponi Tribe, and currently lives in Newport News. He stated that the Tribe does not want its sacred sites disturbed or flooded by the reservoir, or the Mattaponi River harmed by withdrawing large amounts of fresh water.

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He summarized the historical and spiritual value of the Mattaponi River for the Tribe, and emphasized that the River still provides much needed food and income.

(15) Jim McClellan, Ph.D., Professor of History, Northern Virginia Community College: Dr. McClellan submitted comments regarding the Mattaponi Nation and the reservoir issue. He provided a synopsis of the history and culture of the native nations in the region, specifically the Algonquian nations in Virginia, which includes the Mattaponi Tribe. He also summarized the project history and the water needs discussion, as well as the project's impacts on the Mattaponi Indians and treaty rights associated with the Powhatan Confederacy's treaty with the English in 1607. He stated that the Mattaponi Tribe have been raising money for several years to buy back ancestral lands adjacent to their reservation, an effort that would be hindered by the reservoir project, and he referenced a resolution adopted by the Virginia Association of Human Rights Commissioners that supports the Mattaponi. He stated his opinion that the King William Reservoir project should not move forward.

(16) The Virginia Chapter of the National Association of Social Workers (NASW): NASW commented on the RROD in a letter dated 25 April 2001 stating their continued support for denial of the permit application. The NASW's comments are limited to social justice and human rights issues of the Mattaponi and Pamunkey tribes that reside in the areas to be affected by proposed impacts of the project. They described the history of the Mattaponi and Pamunkey tribes that precedes the Commonwealth of Virginia as reflected in the treaty of 1677. The NASW stated emphatically that the treaty should not be violated by the proposed impacts of the project including the loss of livelihood for these tribes and the destruction of historical and spiritual sites valuable to the people. They commented on the responsible and peaceful interaction of the two tribes with the Commonwealth since the treaty was issued, and that the tribes have requested the Governor of the Commonwealth to honor the treaty by not allowing the flooding of their lands for the proposed reservoir. They commented that "To allow the building of the proposed King William Reservoir would be to permit the continuation of the ignominy that the United States has inflicted upon its Native Americans."

(17) Mattaponi and Pamunkey Rivers Association (MPRA): Billy W. Mills, Jr., Executive Director of MPRA wrote that MPRA supports my recommendation to deny Section 404 authorization for the King William Reservoir. He cited specific issues including unacceptable cumulative environmental impacts, inadequate demonstration of water need, and inadequacy of the wetland mitigation plan. Other concerns include adverse impacts associated with the predicted increase in salinity and erosion in the Mattaponi River, impacts on two federally listed threatened plant species, inadequacy of proposed instream flow regime to protect resources, and destruction of Native American cultural sites.

(18) Deborah Revere Beuchelt: Ms. Beuchelt expressed opposition to the reservoir, and specifically addressed the wetland impacts. She stated that wetlands are ecologically important as breeding and spawning grounds, wildlife habitat, floodwater control, groundwater recharge, and water quality. She mentioned two rare species that are present on the Mattaponi River.

(19) Wesley E. Pullman, Ph.D.: Dr. Pullman commented on environmental justice issues. He specifically stated that, contrary to a Newport News city official's claim that failure to build the reservoir would inhibit growth in Newport News and cause the loss of minority jobs, the City has been and will continue to grow rapidly. He recommended the building of desalination plants, which is "more in tune with high quality urban planning and the provision of minority jobs than is the construction of the King

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William Reservoir.” He provided a number of reasons why building desalination plants would be better for the local job market than construction of the reservoir.

(20) Mark Fowler: Mr. Fowler, an Associate Professor of Philosophy at the College of William and Mary, provided comments regarding environmental justice issues. He believes the City of Newport News’ contention that the RROD gives unfair weight to the interests of local Native American peoples over those of a much larger population of minorities and low income groups on the Peninsula, is flawed. He cited three flaws in the City’s position: it misrepresents environmental justice ideals, ignores the special environmental justice issues of Native American traditional cultures, and relies on questionable factual assumptions. He detailed each of these points in his letter.

(21) Jessica Putnam Hughes: Ms. Hughes expressed opposition to the proposed reservoir project and stated that Newport News Waterworks does not act in the best interest of the future water needs for the Peninsula. She asserts that Newport News Waterworks has not adequately protected current water supplies, and cited several examples of pollution and environmental degradation of existing water sources. She recommended that Newport News consider water reuse instead of constructing new reservoirs, and stated that Hampton Roads Sanitation District is already selling gray water to area businesses, but Newport News declined to use this water themselves.

(22) John J. Zeugner, AICP: Mr. Zeugner expressed his opposition to the King William Reservoir project. He indicated that he is a licensed City Planner and an environmental planner/consultant. He cited three main reasons for his opposition, and emphasized that each one alone should be sufficient to justify denying the permit for the project. His discussed environmental damage, the tribal rights of the Mattaponi Indians, and the need for growth management. He objects to the interbasin transfer of raw water and recommends that the Lower Peninsula develop water treatment technologies to render them independent of new water sources.

20. Comments Received from City of Newport News Officials, Employees of Newport News Waterworks and RRWSG Consultants: Since the announcement of my preliminary position in June 1999, the City of Newport News has submitted numerous reports and other documents in support of their proposal. All of the information submitted has been reviewed and fully considered in my evaluation of the proposal. Specific comments on each issue have been addressed throughout this document.

By their own admission, most of the information in the summary reports on environmental and cultural resources impacts that the City of Newport News submitted since I announced my preliminary position on 4 June 1999 were reiterations of previously submitted information. These documents only present the benefits of the project and claim that the project will have little, if any adverse impact on the environment. Many of the City’s claims are speculative and unsupported. After reviewing the applicant’s August 1999 “Environmental Issues Summary,” EPA commented in a letter dated 25 February 2000, “...the Summary report does not represent a balanced and reasonable evaluation of the project and its environmental impacts...it fails to consider the Cohoke Mill Creek watershed as a integrated functioning ecosystem but rather evaluates it piecemeal...does not ‘balance’ the discussion of the benefits of a reservoir on Cohoke Mill Creek, with a discussion of adverse impacts.” EPA concludes, “The Summary represents well calculated bits of information submitted by the RRWSG to support the KWR project. It selects information and data favorable to the KWR project while ignoring data that might present another view. The natural resources under consideration do not exist in isolation nor can they be so conveniently separated from each other for purposes of impact assessment.”

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In a recent letter dated 30 November 2000, the City of Newport News submitted their “Applicant’s Proposed 404 (b) (1) Analysis.” It is unusual for an applicant to submit their own analysis of the 404 (b)(1) Guidelines. The Corps uses EPA’s 404 (b)(1) Guidelines in evaluating discharges of dredged or fill material into waters of the United States under Section 404 of the Clean Water Act. The Guidelines apply to all 404 permit decisions and are not just advisory, but are actual regulatory requirements. A permit for placement of fill material into waters of the United States cannot be issued if the project is not in compliance with the Guidelines except under 404 (b)(2), which allows the Secretary of Army to issue permits given consideration to the economics of anchorage and navigation.

The Guidelines specify that no discharge will be permitted if it will cause or contribute to the significant degradation of waters of the United States. The Corps determines if a project would have significant adverse effects on human health and welfare; life stages of aquatic life and wildlife; the aquatic ecosystem diversity, productivity, and stability; and recreational, aesthetic and economic values. The Guidelines are the substantive criteria used to make a decision on issuance or denial of a permit and the Corps has the sole responsibility for determining whether or not a project complies with the Guidelines.

The City of Newport News has stated that information contained in the EIS should be considered completely accurate and final and that the District should not change its determinations with regard to findings stated in the EIS. However, this notion runs contrary to the concept of NEPA to solicit comments and input from the public regarding the issues presented in the EIS. When the district’s determination of particular issues changes to the point that additional public involvement is necessary, NEPA documentation is supplemented. This is exactly what happened in this case when the District determined that a supplement to the Draft EIS was necessary. Until a final decision is made, analysis of any particular issue is incomplete.

Although the difference between the “administrative record,” the “project file,” and documents responsive to the City’s FOIA request was clearly outlined in the District’s letter of 21 November 2000, the City of Newport News misunderstood the explanation and as an enclosure to a letter dated 30 November 2000, sent several of the documents obtained under their Freedom of Information Act request back to the District “.... to ensure that they are in the record.” Other documents were also enclosed which the City considered relevant to the District’s review of their application for the King William Reservoir including permit decisions on other projects reviewed in the Norfolk District (Ware Creek Reservoir and Lake Gaston Pipeline) as well as permit decisions in the Wilmington District (Coddle Creek Reservoir). In an earlier report entitled “Comparison of King William Reservoir Project with Recently Permitted Reservoirs in the Southeastern United States,” which was submitted on 24 August 1999, the City argued that the King William Reservoir would be less environmentally damaging per unit of water supply benefit than other reservoir projects in Virginia (Ware Creek Reservoir and Beaverdam Swamp Reservoir), North Carolina (Buckhorn Reservoir Expansion and Coddle Creek Reservoir) and Georgia (Horton Creek Reservoir, and Upper Towaliga River Reservoir). As these documents were submitted by the City in support of this permit application, they were reviewed by the District.

Although each district must comply with the same federal regulations and guidelines, outwardly similar projects may receive completely different permit decisions. As each project has its own unique need, environmental impacts, socioeconomic issues, agency concerns and project alternatives, such a comparison of different projects, both between and within districts, is a futile and irrelevant exercise. The Norfolk District has considered the King William Reservoir permit application on its own merits, and in

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accordance with regulation, has compared it only to appropriate alternatives to the proposed action and not to past projects, even if they were similar.

Regarding the Lake Gaston Pipeline, the State of North Carolina had alleged that the Norfolk District granted Virginia Beach a permit to develop a water supply that would be risk free, to the environmental detriment of the lower Roanoke River ecosystem. After reviewing Virginia Beach's supporting documentation, the District agreed with the City that impacts from the Lake Gaston Pipeline would be minimal. Concerns over the effect of the water withdrawal on downstream striped bass were analyzed and found to be largely unsubstantiated, but a permit condition was added that fully mitigated the potential impact. The District's finding that project impacts were insufficient to warrant preparation of an EIS was subsequently borne out after extensive litigation. While the District did not use the same deficit projecting methodology with the Lake Gaston Pipeline project as with the King William Reservoir project, the District reviewed and discounted both high population growth projections (which favored Virginia Beach) and low ones (submitted by North Carolina) and chose to rely on a more defensible, moderate growth projection also supported by the Commonwealth of Virginia. When project impacts are small, a less rigorous permit evaluation is justified (33 CFR 320.4(a)(2)(ii); 40 CFR 230.6(a)&(b)), 230.10).

The Ware Creek Reservoir project posed no impacts to any American Indian tribes. Also, the District was convinced at the time of that permit decision that no water supply alternatives existed that were practicable and less environmentally damaging. The permit review of the Ware Creek Reservoir project predated the Corps/EPA policy of mitigation sequencing (first avoid wetlands, then minimize wetland impacts, and only then compensate for any remaining wetland impacts), as well as the federal government's current policy of 'no net loss' of wetland functions and values. Under today's standards and policies, the gross wetland impacts of the Ware Creek Reservoir (without mitigation) would be compared against other alternatives, not the net wetland impacts (with mitigation). Also, the Ware Creek Reservoir's proposed wetland mitigation plan would be viewed today as being woefully inadequate based on our current understanding of wetland functions, values, and effective compensation. Finally, the principal water supply alternative recommended at that time that avoided wetland impacts was desalination, but in the mid-1980s desalination technology was unreliable, not well tested, and extremely expensive. Advances in technology and the state of the art since that time have made desalination a viable alternative in many cases. If the Norfolk District's analysis of the Ware Creek Reservoir project was less rigorous than our analysis of the King William Reservoir project, it was due to a combination of different project impacts, different rules and policies, and different technological capabilities.

The City also incorrectly assumed that because they followed the District and federal agency guidance and direction, that the outcome of the permit review process would automatically be in their favor, although they had been repeatedly advised against such an assumption throughout the processing of the application. Over the years, the Norfolk District staff has repeatedly informed the applicant of the major impediments to obtaining approval of their particular preferred alternative, yet the applicant has continued to press forward with their proposal. The applicant has expended a great deal of public funds in order to provide the information required for the District's review of their application as well as in their rebuttal of my preliminary position. According to the City, this has cost the RRWSG's taxpayers in excess of \$16 million dollars. However, such an expenditure cannot be considered as justification for permitting a project, if the issuance of a permit has been found to be contrary to the public interest.

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a. Comments Received on the RROD from City of Newport News Officials:

(1) Newport News Mayor Joe Frank: In a letter dated 30 April 2001, Newport News Mayor Joe Frank wrote that while my recommendation was not unexpected, based upon what I had written and said since June 1999, the tone of the RROD makes him question the ability of the Norfolk District to objectively and appropriately fulfill its duties under the Clean Water Act. First, he expressed his shock that the RROD categorized the project as enormously controversial and publicly unpopular. He stated that the volume of letters and postcards were generated by a well-orchestrated letter writing campaign following the issuance of the FEIS. Mayor Frank said that the RROD did not acknowledge the broad-based support the project has attracted from local elected officials, state government, business leaders and congressional representatives. He said he had expected that the comments on the FEIS would be judged on their substance and not by their numbers. He expressed his regret that I had not taken the time to personally visit with those who have worked so long to address the Peninsula's needs.

Comments from state government offices and congressional representatives were addressed in the RROD in Section 18 - Views of Other Federal and State Agencies and Representatives. The views of local city officials regarding the use of surplus water from the City of Norfolk were also incorporated into the RROD. The simple number of comments for or against the project alone has not been given weight in my evaluation. Rather, it is the substance of those comments that is considered. Nevertheless, the actual number of comments is a fact that I felt appropriate to include in the record to show the public's interest in the project. A factual statement of the number of comments received for and against the project was only referenced once in the document, therefore, it should be clear that the substance of the comments was evaluated in the RROD, not their numbers.

It is unclear to me who Mayor Frank believes I should have met with to discuss the King William Reservoir project that I did not meet. In addition to continuing former District Engineer Robert Reardon's practice of attending project update meetings with the City of Newport News and RRWSG members and their attorneys and consultants both at the District and on the Peninsula, I met with the City on numerous occasions at their request to discuss specific aspects of the project. I conducted a joint site visit of the King William Reservoir impact area and Mattaponi River intake location with City of Newport News staff and their consultants; I was given a tour of the Harwoods Mill Water Treatment Plant by Newport News Waterworks staff; and I met with City of Newport News officials, and on a separate occasion with the Mayors of Newport News and Hampton. (Later in his letter, Mayor Frank referenced our discussion of the King William Reservoir project when we met in February 2000.) During my command at the Norfolk District, I have discussed the King William Reservoir with the Peninsula Chamber of Commerce, Congressman Pickett, Congressman Scott, Congressman Bateman, Senator Robb and Senator Warner.

Mayor Frank challenged me to show him another wetland mitigation plan, which is comparable in scope and technical quality to the one the City of Newport News produced through a time consuming and expensive collaboration effort with state and federal agency representatives. He claims that once I decided that the project would not be permitted, it became the task of my staff to dismiss the hard work of the many dedicated and knowledgeable wetland experts who contributed to their plan. The RROD (page 193) noted that "the applicant has made an impressive effort to minimize and compensate for the wetland loss," and that "if fully successful, the proposed plan would replace the acreage amounts of lost wetlands." However, I could not and still cannot agree that the proposed plan would provide full functional replacement for the impacts associated with the loss of an integrated, mature wetland habitat

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such as is found in the Cohoke watershed. Additionally, even if the Corps were to issue a permit for the project, there are many comments/concerns regarding the wetland mitigation proposal that still have not been adequately addressed by the RRWSG.

Mayor Frank commented that he is bothered by the emphasis the RROD placed on the “possible” cultural impacts on Native Americans and contends that there has been no meaningful effort to meaningfully evaluate the validity of these “potential or possible” impacts. Mayor Frank stated that he finds my perspective on the cultural effects of this project “naïve at best.” He stated his belief that rather than being harmed, the Tribes and their culture would be enhanced if the project proceeds.

A search revealed that the word “possible” is not used in the RROD in reference to cultural impacts. However, the word “potential” is used in the RROD to describe effects when their extent and certainty are less definitive. I disagree that the District made no effort to evaluate the validity of the potential impacts. My staff conducted many meetings with the City of Newport News and the Tribes in an effort to identify potential impacts. After consultation with the VDHR, ACHP and EPA, the District determined that potential impacts to TCPs and environmental justice should be addressed through a study conducted by a qualified ethnographer. Cultural anthropologists with the College of William and Mary were contracted to perform the TCP study. When the City of Newport News and their consultants questioned the bias of the principle investigators of that study, I directed the Norfolk District archaeologist to review their claims. I appreciate Mayor Frank’s point of view on the ability of the City’s compensation package to enhance the Tribes’ culture, however, I believe that the Tribes themselves have a better perspective on what the impacts to their culture and way of life would be than does Mayor Frank. The Tribes clearly do not believe that their culture would be enhanced by either the project or the City’s proposed mitigation package.

Mayor Frank stated that he is “...very troubled that in the guise of environmental justice, you have given the Mattaponi Tribe, in particular, veto power over a water supply project that would have real and long-lasting benefits for more than 600,000 residents who will call the Peninsula home by 2040.” Because many of the residents in Hampton and Newport News would be economically disadvantaged, Mayor Frank believes that I have not taken the loss of economic opportunities into account in my environmental justice and public interest reviews. He stated that “Letting your personal bias dictate a decision that will have such far reaching (e)ffects on 600,000 people, many of which are minorities, is nothing short of an overzealous abuse of regulatory authority.”

It is true that I have made no distinction between the minority and majority groups on the Peninsula when considering the impacts of a recommended denial to Peninsula residents, as this is not the intent of the environmental justice review. However, as stated on page 199 of the RROD, I have not ignored the impact that my decision could have on citizens of the Peninsula. On page 138 of the RROD, I have also considered the socioeconomic impacts that the King William Reservoir would have on increased water rates as expressed by Peninsula residents. In addition, I have added a new section to the discussion of socioeconomics to address comments received on the RROD concerning loss of development and expansion potential on the Peninsula.

Finally, Mayor Frank stated “The Peninsula expected more and deserved more than it got from your recommended decision. We have to be thankful that your decision is not the final one in this matter. Governor Gilmore and the State Health Commissioner did not concern themselves with the ‘controversial’ nature of the King William Reservoir project. They were not looking for a safe position in

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this so-called controversy. They did the balancing which the U.S. Army Corps was supposed to do and in doing so they wisely chose to advocate for a federal permit for the King William Reservoir.” He indicated that he intended “...to continue to speak out for what I know to be the proper course of action for meeting the Peninsula’s water supply needs in the future.”

(2) Newport News Vice Mayor, Charles Allen: In a letter dated 26 April 2001, Vice Mayor Allen expressed his concern with the Norfolk District’s handling of the environmental justice and cultural resources issues surrounding the King William Reservoir project and referenced his letter of 26 May 2000 and my response to that letter concerning my rationale for discontinuing the Section 106 consultation.

Vice Mayor Allen commented on my decision to discontinue the Section 106 consultation process and his belief that the announcement of my preliminary decision prejudiced the outcome of the Section 106 process. The 4 June 1999 letter was written to alert the City that I saw fundamental problems with their application at that time. The letter was not a permit denial, but rather an indication to the City that I had serious concerns about their proposal, based upon the information I had at the time. This was intended to allow the City of Newport News to make an informed decision about continuing to commit resources to a proposal that didn’t appear likely at the time to ultimately receive authorization. Due to my preliminary position of denial, there would no longer be a federal action, and Section 106 consultation was suspended. Although discussions with the consulting parties on the MOA and potential TCP mitigation issues were suspended, some consultation has occurred since that time including distribution of the final TCP report, further coordination with the NPS on documents concerning the sacred site, and a meeting and correspondence with the City of Newport News concerning Section 106 issues.

Vice Mayor Allen stated his belief that the reason for my June 1999 preliminary decision was based on the water need issue and that by February 2000, my reason for denial had changed to the environmental justice and cultural resources impacts to the Native American tribes. My 4 June 1999 letter to Assistant City Manager Randy Hildebrandt states that there were two critical issues that lead me to my preliminary position to deny the permit for the King William Reservoir: 1) the lack of a demonstrated need to destroy 437 acres of wetlands, and 2) the cumulative adverse environmental impacts of the project, particularly the potential for a disproportionately high and adverse effect to an American Indian minority population. In my letter of 3 February 2000 to Mayor Joe Frank, I restated these two critical issues. There was no change in my rationale for my preliminary decision. As explained in my letter to Mayor Frank, I was clarifying that either of these issues alone would lead me to deny the permit. Vice Mayor Allen had expressed his confusion over this same issue in a letter dated 26 May 2000, to which I responded on 7 June 2000 with further clarification that both of these reasons are of equal concern to me and that there had been no shift in emphasis from water need to cultural resources. The fact that one or more of these issues received more or less emphasis in any particular document prepared by the District does not indicate, nor mean, that the District’s focus has “shifted.” The District has consistently expressed concerns about these issues.

Vice Mayor Allen contends “ It appears that once you prematurely announced your preliminary decision in June of 1999, the entire focus of the Norfolk District efforts was to seek out every possible avenue to defend that position no matter what the facts suggested.” He stated his belief that my preliminary position was flawed and that nothing presented since then, including my 200-page RROD has convincingly demonstrated that it is not in the public interest to allow the King William Reservoir to be constructed. The announcement of my preliminary position was not premature because I had enough information at that time to inform the applicant of my preliminary intention to deny the permit. It is the policy of the

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District to inform permit applicants of the preliminary findings on their application so that they may decide to either modify their proposal to make it environmentally acceptable, provide more information in support of their proposal or withdraw their application. The City of Newport News chose to submit additional information in support of their proposal. I have performed an extensive evaluation of the application and all information submitted for my review in the preparation of my recommended Record of Decision.

(3) Newport News City Manager, Ed Maroney: In a letter dated 3 May 2001, Newport News City Manager Ed Maroney submitted an attached document dated 4 May 2001 entitled, "Comments to Norfolk District, U.S. COE Recommended Record of Decision (RROD); March 20, 2001 and IWR Special Study; March 1, 2001" that he indicated serves as formal comments from the City of Newport News and the RRWSG on my RROD. He indicated his belief that my RROD either dismisses or discounts twelve years of work on the King William Reservoir. He cited support by the Hampton Roads Planning District Commission and many of its member localities. He stated "This regional support, when combined with the Governor's strong position, should be an undeniable message that your recommendation has missed the mark." He further stated that "...it is evident that it does not represent a balanced public interest review ... too little consideration has been given to the positive environmental and cultural resources benefits that would occur as a result of the mitigation programs that have been proposed." Mr. Maroney stated his belief that my RROD "...contains numerous errors, many misstatements and more than a few misinterpretations of the administrative record."

Mr. Maroney offered the following summary of the RRWSG's comprehensive comments: the 4 June 1999 announcement of the District's intent to deny the permit for the King William Reservoir reflected a sudden and dramatic change in attitude about the project by the Norfolk District; the HDR and IWR forecasts of demand through 2050 are so close that this is no longer a debatable issue; the RROD's findings regarding "dead storage" are absolutely wrong; the mitigation proposals which District staff also had a hand in shaping are now a target for criticism in the RROD; there would be no measurable impact to the Mattaponi River from project operations; the RROD grossly overestimates additional flow to Beaverdam Creek; the Cohoke Creek wetlands are not unique or pristine; there would be no impacts to threatened and endangered species; the wetland mitigation plan is a model effort and is the product of a consensus among federal and state agency representatives, yet the Norfolk District questions the success of the very sites that District staff helped select and evaluate; it is preposterous that anyone would believe a near-by lake might endanger the culture of a Native American tribe. He believes that the RRWSG's reasons for delaying Phase II archaeological investigations are misconstrued in the RROD and that the RROD glosses over the mitigation packages discussed in great detail with the Tribes; the piecemeal solutions offered in the RROD are not ones the City, their partners or any community should have to accept. He concluded that the Norfolk District did not conduct a fair and open process, never offered feedback on key issues such as minimum instream flow rules, reservoir downstream releases and the Mattaponi River monitoring plan and after the 4 June 1999 preliminary decision, the Norfolk District became an advocate of one point of view and no longer functioned as the objective arbiter. Finally, Mr. Maroney stated that "Despite its length, your RROD does not convincingly demonstrate that a permit for the King William Reservoir should be denied."

The District's detailed responses to Mr. Maroney's comments and the comments contained in the attached report by the City of Newport News and the RRWSG are addressed in the appropriate sections of the Final RROD.

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(4) Newport News Assistant City Manager, Randy Hildebrandt: In a letter dated 1 May 2001, Assistant City Manager Randy Hildebrandt outlined his objections to various statements in the District's ROD and indicated that the City's project did not receive a fair and objective public interest balancing of its benefits and impacts. He described the Project History section of the District's Recommended ROD as "replete with mischaracterization and innuendo"...and... "an attempt to manipulate historical information to portray the work of the Regional Raw Water Study Group and the City of Newport News, in the most negative way possible." The comments contained in Mr. Hildebrandt's letter are addressed in the "Project History" section of the Final RROD.

(5) Newport News City Councilwoman Mamye BaCote: In a letter dated 26 April 2001, Councilwoman BaCote stated her belief that I suggested greater dependency on groundwater. On the contrary, I stated just the opposite on page 150 of the RROD.... "It should be emphasized that the District is not advocating the additional use of groundwater to supply the region's need unless it is determined by the state to be appropriate. The District recognizes that over-reliance on groundwater resources can result in depletion of aquifers, land subsidence and the disappearance of wetlands that are supported by those aquifers."

Councilwoman BaCote stated her belief that my Recommended ROD cites short-term patchwork alternatives that have not been appropriately studied and is not reflective of long-term thinking about future water supply. She stated her belief that the RROD is not a balanced public interest review but focuses on adverse impacts to the environment and the Native Americans while ignoring the impact to the nearly one half million people living on the Peninsula if this water source is not secured. Councilwoman BaCote's comments are similar to comments from Mayor Frank and are addressed in the Final RROD in Section 8 q. - Socioeconomics. Councilwoman BaCote also made comments on cultural resources issues which are addressed in Section 8 m. of the Final RROD.

(6) Newport News City Councilwoman Madeline McMillan: In a letter dated 1 April 2001, Newport News City Councilwoman McMillan wrote to thank me for my decision to deny the King William Reservoir and included a letter she had written to Senator John Warner. She stated that having run for both her terms unopposed, she is confident that the people of her district share her belief that the construction of the reservoir was unjustified. She believes that the District has made a thorough analysis and a fair and unbiased decision in the face of political pressure and personal insults. She feels that the decision can stand on its own merit and should not be subjected to political abuse.

(7) Newport News City Councilman Terrence Martin: In a letter dated 4 May 2001, Newport News City Councilman Martin wrote to inform me that he is convinced of the need for the King William Reservoir to maintain the high quality of life on the Peninsula. He stated his belief that the economic growth of the Peninsula has been sustained by the continued development of the Newport News Waterworks. He encouraged me to reconsider and reverse my decision.

(8) Newport News City Councilman Herbert H. Bateman, Jr.: In a letter dated 30 April 2001, Newport News City Councilman Bateman wrote to express his profound dissatisfaction with my Recommended Record of Decision on the King William Reservoir permit application. He stated that his dissatisfaction stems from his concern with the "shifts in the thrust of your arguments against our project over the past two years." He cited my letters of June 1999 and February 2000, Vice Mayor Charles Allen's letter of May 2000 and the December 1999 meeting between the City of Newport News, the District and the IWR panel as evidence that there was a sudden shift from the issue of need to cultural

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impacts as the reason for denial. As stated above in my response to comments from Vice Mayor Allen, there was no change in my rationale for my preliminary decision. My reasons for recommending denial of the King William Reservoir project have always been clearly stated as: 1) the lack of a demonstrated need to destroy 437 acres of wetlands, and 2) the cumulative adverse environmental impacts of the project, particularly the potential for a disproportionately high and adverse effect to an American Indian minority population.

Councilman Bateman stated that he is puzzled by what I see as so objectionable about the proposed reservoir. He stated that arguments in the RROD concerning environmental losses "... are little more than an elaborate smokescreen" and "what is driving this decision must be your personal view about the impact of this project on Native Americans." He stated his belief that I have used objections from Native Americans "under the guise of environmental justice" to deny the project. He stated that concern for environmental justice should also give weight to the successful efforts of the City and King William County to mitigate concerns of African Americans living along Route 626, a group of minorities who would be most directly impacted by the project. He also believes that I have not considered the future economic opportunities and quality of life of the many minorities who live or work in Newport News and on the Peninsula.

The African-American community is addressed in the Environmental Justice Section of the Final RROD. In accordance with the Environmental Justice Executive Order and guidance, the focus of the Corps analysis is on disproportionate effects of an action on minority and low income populations. Assuming that a denial of this application actually would result in a lack of reliable and affordable water supply, such an effect would not appear to be a disproportionate impact on minority and low income populations, but rather would appear to affect all residents in the RRWSG service area alike. However, as several alternatives are available to meet the need with fewer environmental impacts, a denial of the King William Reservoir would in no way eliminate the RRWSG's ability to provide a reliable and affordable water supply. Councilman Bateman's comments on the loss of future economic opportunities for Peninsula residents are similar to those expressed by Mayor Frank and Councilwoman BaCote and are addressed in both my response to Mayor Frank's comments above and in a new section under socioeconomics to address comments received on the RROD.

Finally, Councilman Bateman stated his belief and the belief of his father, the late Congressman Bateman, that my preliminary decision on perceived cultural impacts to Native Americans was based on claims about a sacred site. Comments on the issue of a sacred site are addressed in the Historic Resources and Traditional Cultural Properties section of this document.

Councilman Bateman expressed his view that my preliminary decision was "ill-conceived and premature" and that the RROD is a "skillful maneuver to now construct a logical and substantive justification of your preconceived notions about our project." He stated his doubt that my recommendation would stand up to thoughtful and objective scrutiny. Councilman Bateman's comments on this subject are similar to those expressed by Mayor Frank, Vice Mayor Allen and Mr. Ed Maroney and are addressed in my responses to their comments above.

b. Comments Received on the RROD from Employees of Newport News Waterworks:

(1) Newport News Waterworks Planning and Programs Manager, David Morris: In a letter dated 4 May 2001, David Morris, Planning and Programs Manager of Newport News Waterworks

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commented on the District's RROD. Mr. Morris stated his belief that there were many errors and misunderstandings presented in the District's RROD that make it indefensible. He stated his hope that I would reverse my recommendation to deny the permit and leave a legacy rather than an unsolved problem.

Mr. Morris stated his belief that the King William Reservoir project was held to a different and higher standard than other projects under review in the Norfolk District. He said that "...the applicant has had to do the nearly impossible, which is prove the negative, that some effect will not occur or will be minor and any major effects can be mitigated." Under the Corps public interest review and the NEPA review, it is the responsibility of the applicant to provide convincing information, if it is available, that their project would not result in unacceptable environmental impacts.

Mr. Morris went on to state that "It would seem logical to give projects that are clearly the most important of all public works projects some deference over economic development proposals or the siting of landfills and roads." This project was treated objectively in accordance with applicable laws and regulations. Project purpose is one factor considered in the Corps' evaluation process.

Mr. Morris stated "It is particularly disturbing ... that the ROD introduces concerns that the District know are either not relevant issues or were resolved long ago. The Bald Eagle, Anadromous fish habitat in Upper Cohoke Creek and the closed King William County Landfill are but a few examples." I must disagree with Mr. Morris. All of the issues he listed are relevant. The District's RROD includes a complete discussion of all issues reviewed by the Norfolk District in the evaluation of the City's permit application. The District's findings on these issues, and all others, must be contained in my RROD, whether or not they were completely resolved during the processing of the application. However, as outlined in Section 8 g. - Endangered or Threatened Species, the RRWSG had agreed to conditions to protect the bald eagle and the sensitive joint-vetch, but later omitted these conditions from their final 'Mitigation Program, Fish and Wildlife Mitigation Plan.'

Mr. Morris claims that an unnamed member of the District staff told the City "you've got a project" when the final dam site and 2 to 1 mitigation proposal were presented. The decision to issue or deny a permit is not pre-determined by District staff. District staff can only make recommendations as to whether a project should be permitted or denied.

Mr. Morris stated his belief that the Norfolk District must have given IWR a special, private instruction other than that contained in the Scope of Work, to use a higher standard of review for the RRWSG's needs assessment. No such instruction was given to IWR.

Mr. Morris stated his belief that the project purpose "...was inappropriately narrowed to just look at what future demand number may be the best forecast." As stated on page 3 of the RROD, the applicant's stated purpose for the project is "To provide a dependable, long-term public water supply for the Lower Virginia Peninsula, in a manner which is not contrary to the overall public interest." I defined the overall project purpose as follows: to satisfy the water supply needs of the localities in the Regional Raw Water Study Group service area through the year 2050. I do not understand how this could be a narrow definition when it is based on the RRWSG's own long-term, 50-year planning period.

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In a separate letter also dated 4 May 2001, labeled “Confidential Information,” Mr. Morris commented on several issues relating to the District’s cultural resources review. These comments are addressed in Section 8 m. of the Final RROD - Historic Resources and Traditional Cultural Properties.

(2) Newport News Waterworks Employee, Lee Ann Hartmann: In a letter dated 3 May 2001, Lee Ann Hartmann commented that the RRWSG partners were led to believe that they were on the right track, providing the necessary information and following all the rules, then suddenly, they were told that the environmental and cultural issues were too great to mitigate. She believes that after 13 years of working on this water supply project, now is not the time for the Corps to announce that it isn’t needed or cannot be permitted. She stated “It’s obvious who deceived who.” As stated in the RROD, the Norfolk District has been involved in the review of the King William Reservoir project since June of 1989, although the project proponents had organizational meetings as early as March 1987. Ms. Hartmann’s statements concerning “following the rules” are similar to those made by Mr. Hildebrandt and are addressed in the “Project History” section of the Final RROD.

Ms. Hartmann commented, “Collectively, the partners have bent over backwards so much to appease the agencies and the opposition, we should own stock in Doan’s Pills.” She believes that the applicant has never been given credit for extra work or adjustments they have made to lessen the environmental impacts. She quoted a statement made by the RRWSG’s consultant, Dr. Thomas King that in his 35 years in historical preservation, he had never encountered a project proponent who had bent as far over backwards to address Indian concerns. The RROD acknowledges and describes multiple occasions when the City of Newport News modified their application to reduce environmental impacts.

Ms. Hartmann stated her belief that the District should know better than to give credibility to the “misinformation and sleaze campaigns” and “bunk” from opponents of the project. She stated that the Norfolk District “allowed unsubstantiated and false information and allegations to become part of the picture” and “...dismissed project reports by engineers and scientists and gave credit to professional wannabe’s.” She asked, “What does this say to the community of educated individuals who invest years of their lives to get degrees and make a living in their respective fields? What does this say about your staff?” Substantive information submitted by the City of Newport News, by supporters of the project and by opponents of the project has all been reviewed by qualified, degreed and professionals, both within the Corps of Engineers staff and from the consulting community.

(3) Newport News Waterworks Employee, Nancy Howard: In a letter dated 4 May 2001, Nancy Howard stated that she is very angry about my decision and that the Norfolk District had led the applicant down a path of procedures to a permit at the expense of years of work and 18 million dollars and then said no to a permit. She stated that the City and their consultants had made a Herculean effort to modify plans and have gone the extra mile to meet the requirements of the Norfolk District. Ms. Howard’s comments are similar to those made by Ms. Hartmann and Mr. Hildebrandt and are addressed in the “Project History” section of the Final RROD.

Ms. Howard outlined her role with the project relating to historic/cultural resources and environmental justice to demonstrate that she, along with the City, made a genuine commitment to learn about environmental justice and in their efforts to consult with Native American tribes in King William County. She commented that the RROD downplays, ignores or misrepresents many of the efforts that have been made by Newport News to enhance their understanding of the regulations, the Native American Tribes in

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King William County, and historical/cultural as well as environmental justice issues in general. She listed the following actions that were taken:

1. Making well over 100 contacts with the Tribes through letters, phone calls and meetings in a seven-year period.
2. Arranging numerous meetings with the Tribes and with their Councils, on the Reservations and at other locations at their convenience.
3. Hiring outstanding professionals including archeologists (one who had worked with both the ACHP and the VDHR, and one who had been on the staff of ACHP and co-authored National Register Bulletin 38 of Section 106, dealing with TCP's), an attorney specializing in Indian law and another attorney specializing in environmental justice issues, and other cultural resource experts.
4. Hiring a Native American from one of the three King William Tribes to assist in the archeological work conducted to date.
5. Arranging for the attorney specializing in Indian law to conduct training for all project team members as well as City staff and consultants who were dealing with Native American issues on the project.
6. Completion of a continuing education course by two staff members and one consulting attorney about Virginia Native Tribes through the University of Richmond, taught by a member of one of the Virginia Tribes.
7. Hiring Native Americans to work with project staff on cultural understanding, protocol and sensitivity issues.
8. Working for a staff member's appointment to the National Environmental Justice Advisory Council's (NEJAC) Indigenous People Subcommittee to enhance the applicant's understanding and working knowledge of EJ. During her tenure on NEJAC, she was one of the authors, along with several Native Americans from across the country, of an EPA publication "Guide on Consultation and Collaboration with Indian Tribal Governments and the Public Participation of Indigenous Groups and Tribal Members in Environmental Decision Making." This document can be downloaded from EPA's web site.
9. Maintaining open and sincere minds, approaching the Tribes with respect, working diligently to win their respect and to meet their needs during the negotiations on the MOA.

Ms. Howard's statement that the RROD reflects none of these efforts is incorrect. The RROD acknowledges many of the points that Ms. Howard listed (as does the District's Chronology of Section 106 Coordination and Environmental Justice Issues). However, to the extent that the District was unaware of some of these efforts, such as training and courses that she and other project team members completed, Ms. Howard is correct that the RROD does not reflect them. Items 1-4 are discussed in the RROD. Although every meeting and phone call could not be addressed, the RROD makes it clear that Newport News has met with the Tribes. In fact, page 128 of the RROD mentions the early meetings between the Tribes and Newport News, and on page 130, the RROD states, "The District agrees that the City of Newport News has been willing to cooperate with the Tribes...." Also, page 122 of the RROD acknowledges the fact that a Native American was hired to participate in the archeological studies. Where appropriate, Newport News' consultants are mentioned, but it is not the purpose of the RROD to provide details about every consultant and their qualifications. In regard to items 5-8, the District was not aware of these events until reading Ms. Howard's letter. Even if the District had known of them, these actions would not have been included in the RROD, since they are not directly relevant to the issues at hand. The City of Newport News should be commended for their efforts to learn about the issues

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involved in their project. Despite their claims that the project's impacts are not significant, they were clearly aware of the significance, and spent much time and effort to learn about these issues. In regard to item 9, this is Newport News' opinion of the meetings that occurred, and not necessarily the opinion of all consulting parties. In addition, it is impossible for the District to know if Newport News approached the meetings with "open and sincere minds," and it should be noted that the District was not in attendance at all of the meetings between the City and the Tribes.

Ms. Howard contends that the District is extending beyond its macro level of oversight and policy management to override local and state governing authority regarding project need. A similar comment was made by James Ryan of Troutman Sanders Mays & Valentine. Section 404 of the Clean Water Act (CWA) and its implementing regulations charge the Corps of Engineers with evaluating permit applications for the discharge of dredged and fill material into waters of the United States. As part of its public interest review the Corps does by necessity consider issues such as the need for the project. Cases interpreting Section 101(g) have suggested that in cases involving both the State's interest in allocating water and the Corps' interest in administering water and wetland resources, some interference with the State's interests may be unavoidable. See, e.g., Riverside Irrigation District v. Andrews, 758 F.2d 508 (10th Cir. 1985).

Ms. Howard commented that when she visited the District in mid-April to review comment letters received to date on the RROD, letters from Peninsula residents supported the project two-to-one. She noted that 81% of the letters against the project were submitted as form letters, post cards, the briefest of e-mail messages and one phone call. She stated that these letters are simply "regurgitations" of what they have been fed by the opposition, in contrast to the 84% of project supporters who submitted well-thought out comments and concerns. As I have stated many times previously, the simple number of comments for or against the project alone have not been given weight in my evaluation. Rather, it is the substance of the comments that is considered. Nevertheless, the actual number of comments is a fact that I felt appropriate to include in the record to show the public's interest in the project. This issue is mentioned in many of the City's comment letters. Since the City of Newport News and others have shown such concern over this issue, I have given it more attention in my Final RROD than I would otherwise have done.

Ms. Howard is correct that many form type letters and postcards have been received from individuals opposing the project that reflect comments suggested by the Sierra Club and other environmental groups. However, the same can be said for comments from project proponents. The City of Newport News prepared suggested comments in their "Call to Action Water Alert" and the Peninsula Pro-Water Coalition ran a series of newspaper advertisements in the Peninsula's Daily Press with suggested comments for supporters of the project to use in their letters. Many supporters of the King William Reservoir have submitted form type letters and postcards that reflect these suggested comments. Comments from the general public are addressed in Section 19 of the Final RROD – Summary of Public Comments Received on the Environmental Impact Statement and the District's Recommended Record of Decision.

Finally, Ms. Howard expressed her outrage that the "deliberate misinformation" from the Sierra Club seems somehow to have more credibility with the Norfolk District than the "...fine work done by a cadre of engineers, scientists, archaeologists and other professionals." This comment is similar to that of Ms. Hartmann and is addressed above.

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(4) Newport News Waterworks Employee, Donald Rice: In a letter dated 1 May 2001, Donald Rice stated that all components of the RRWSG plan have been successfully implemented but one critical component because the District stands in the way. He contends that desalting, reuse, conservation and drought restrictions have already been done and they have substantially delayed the impending need for a new surface water source and storage facility, but the need still exists. He stated that the Virginia Water Protection Permit was issued over three years ago, no less than eight wetland mitigation plans have been submitted to District staff, each more generous and detailed than the one before; concerns of the Native Americans were nearly resolved before consultation was abruptly ended by the District's letter of 4 June 1999; and everything the District staff requested has been provided. He believes that the Norfolk District has been trying to stall the project and bankrupt the applicant. Mr. Rice's comments on the mitigation plans are addressed in Section 8 f. (2) (g) of the Final RROD - Comments Received on the RROD Regarding the Applicant's Compensation Proposals.

Mr. Rice contends that I deliberately distanced myself from this proposal from the beginning, so I know little about it except what I hear from my superiors and staff. He stated that I delegated all progress review meetings to Mr. William Sorrentino then suspended the meetings. He contends, "You set aside the applicant's reports (I have seen them in the permit file, virtually untouched and unread – in sharp contrast to the tattered and shopworn condition of reports from project opponents) and you have told the applicant time and time again, 'I don't need any more information'."

Mr. Rice's comments about my attendance at meetings are similar to those of Mr. Hildebrandt and Mayor Frank and are addressed in the Project History section of the Final RROD. Since I have no superiors at the District level, I assume Mr. Rice is referring to General Rhoades at NAD. NAD staff have known since my receipt of Governor Gilmore's June 1999 letter supporting the project that the final decision would be made by the Division Commander unless a permit was issued at the District level, therefore, the Division Commander has intentionally remained uninvolved so that he would not be influenced in his final decision. It is unclear to me how Mr. Rice could know whether my staff and I have read a document just by looking at it. In some cases, the City of Newport News submitted multiple copies of documents for my staff's review. These were distributed to the staff and an unmarked copy was retained for the official project file. When only one copy of a document was submitted, the original was retained for the official project file and copies were made for the staff. I expect that what Mr. Rice viewed as "untouched" were these unmarked copies.

Mr. Rice's statement that I didn't ask for more information contrasts with statements of other City of Newport News staff who believe that I have continued to ask for more information at their great expense. In fact, in my letter of 4 June 1999 and subsequently thereafter, I afforded the City of Newport News an opportunity to submit any additional information they wished in support of their project.

Mr. Rice quoted from a statement made by Jay Kardam of the Sierra Club on an unrelated matter concerning the need for "continued, organized, confrontational agitation ... aimed at those who will make the decision to build or not to build ... officials ... should be mercilessly abused, shamed, ridiculed and otherwise made to suffer pain." He contends that my staff and I have played into the Sierra Club's hands and he wants to know why. My staff and I do not endorse the recommendations attributed to Mr. Kardam.

Mr. Rice then went on to cite "... a few examples of the unfair manner in which the Norfolk District has treated the applicant." He stated that I have allowed the prominent display of a poster in the project

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manager's office proclaiming "SAVE THE MATTAPONI, STOP THE RESERVOIR," and a cartoon commentary that appeared in the Daily Press on 7 June 1999 depicting a man labeled "King William Reservoir" being shot through the heart by an arrow labeled "Army Corps of Engineers." Mr. Rice did not mention that the project manager has also displayed articles and memorabilia that support development of the reservoir. While any such display of items may be perceived as inappropriate, I have no reason to question the professional objectivity of my staff. Many individuals within the District have participated in this decision-making process. Their personal views were not a factor in the decision. Nonetheless, the Regulatory Branch staff has now been counseled on the perception that such displays may cause.

Mr. Rice parenthetically noted that "When one of the IWR panelist discovered how the (IWR) report was being misused, he immediately withdrew his name from the report and refunded his \$2,500 fee. His integrity is refreshing." The City of Newport News made a similar allegation during the December 1999 meeting between Newport News and the IWR panel. The City of Newport News' verbatim record shows that Mr. Roland Steiner's role was clarified for all present (including Mr. Rice) as follows: Mr. Steiner was appointed as the fourth member of the IWR panel to be the "tie breaker" in the event that the other panel members did not agree on any issue. As the three panel members were in complete agreement, Mr. Steiner's services were not required. As he had never been sent payment, it was not necessary for him to refund the agreed upon fee for his services. All three panel members confirmed at the meeting that they were in complete agreement and fully supported the findings of the IWR report. Mr. Steiner has never reported any dissatisfaction with the report to IWR.

Mr. Rice quoted a statement made by one of the HEP team members questioning the need for a HEP study and stated that "Your staff just laughed - and continued plodding along, completely disregarding his advice." During the 17 April 1997 HEP meeting, as documented in minutes issued by Malcolm Pirnie, Inc. on 2 June 1997, the District had responded that for a project of this scope, a mitigation plan would be required that provides for compensation of wetland losses and addresses habitat losses, as determined by Habitat Evaluation Procedures.

Mr. Rice contends that since my 4 June 1999 letter, the Norfolk District has practically closed its doors to the applicant and refused to communicate, walked out of a meeting, and withheld critical letters. He then partially quoted from an e-mail message between the project manager and the executive director of the Mattaponi and Pamunkey Rivers Association as evidence that my staff has "gone out of its way to encourage communication with opponents." The District has communicated openly with the project proponents and project opponents, both before and after the June 4, 1999 letter. I do not believe that this statement, taken out of context, is an accurate reflection of the District's overall practice.

Mr. Rice contends that my staff obviously does not take the applicant seriously and cited another example from an e-mail message between two District employees about a recent boat trip to examine fringe wetlands in an existing Newport News reservoir. As I have previously stated, personal views were not a factor in the decision-making process.

Finally, Mr. Rice stated, "Your staff has proudly pointed out from time to time that the Corps is the 'honest broker.' However, you have deliberately isolated yourself from the applicant and relied on staff that have not taken the applicant seriously. Under those conditions, you cannot possibly have made a fair and informed decision." As outlined elsewhere in this document, I have attended many meetings with the City of Newport News and their consultants to discuss various aspects of their project. Also as stated

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earlier, many District staff members were involved in the evaluation of this project. At the staff level, the project manager coordinated the efforts of several team members assigned to address various issues. These staff members were supervised by a Regulatory Section Chief, who was supervised by a Regulatory Branch Chief, who was supervised by a Technical Services Division Chief. The nature of my position prevented me from being involved in the permit process on a day-to-day basis. However, due to the size of the project, the degree of the impacts, and the degree of public interest in the project, I and the supervisory levels below me remained extremely informed and involved throughout the processing of the application.

c. Comments Received on the RROD from RRWSG Consultants:

(1) James Ryan, Troutman Sanders Mays & Valentine: Mr. Ryan, an attorney representing the RRWSG, stated that the RROD “improperly substitutes its judgment for the Commonwealth’s” and treats Newport News and its local government partners differently from other local governments in the Mid-Atlantic and Southeastern States. As stated in the RROD, the Norfolk District and other Districts in the region look to the same laws, regulations and guidance in evaluating permit applications, however, each permit decision is made on the basis of the particular facts in each case. Therefore, any perceived inconsistency between this recommended decision and others within the District or in nearby Districts is likely a result of the factual differences between the projects.

Further, he claims that the RROD contains many incorrect statements and reaches incorrect conclusions, including the effects of the water withdrawal on salinity in the Mattaponi River, the value of the Cohoke Creek wetlands, and the adequacy of the mitigation plan. He predicts that the decision recommended in the RROD will push the Virginia Peninsula toward inappropriate use of groundwater and will push new development into rural areas, encouraging urban sprawl. Mr. Ryan’s comments are addressed in the appropriate sections of the Final RROD.

(2) George Somerville, of Troutman Sanders Mays & Valentine: Mr. Somerville, an attorney representing the RRWSG, submitted a number of comments as counsel for the City of Newport News. He stated that contrary to the implications in the RROD, Newport News did not select the King William Reservoir as their preferred alternative until 1993, and they continued to pursue the Black Creek Reservoir option even after reaching agreement with King William County. He also addressed Section 106 issues relating to the sacred site in the Cohoke Creek area, environmental justice issues, and the impacts of the reservoir on the land acquisition goals of the Mattaponi Tribe. Mr. Somerville’s comments are addressed in Sections 6 and 8 m. of the Final RROD.

(3) Newport News Consultant W. V. “Jack” Hibbert, P.E., Vice President of HDR Engineering, Inc.: Mr. Hibbert submitted HDR Engineering’s response to the IWR Review of the RRWSG Water Needs Assessment 2000-2050. He stated that with a few exceptions, HDR and its sub-consultant, Maddaus Water Management, generally agree with IWR’s review comments. However, they do not concur with IWR’s findings regarding the timing for new water supplies on the Lower Peninsula. Mr. Hibbert’s comments are addressed in Section 7 of the Final RROD.

(4) Newport News Consultant John P. Hartigan, P.E., Senior Associate Camp Dresser & McKee: Mr. Hartigan submitted comments on the IWR Special Study (1 March 2001) and on the water shortage risk conclusions in the RROD. Mr. Hartigan’s comments are addressed in Section 7 of the Final RROD.

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(5) Newport News Consultant David Dutton, Cultural Resources, Inc.: Mr. Dutton commented on cultural resources, specifically application of the Section 106 process, eligibility of sites for the National Register, the Memorandum of Agreement, the Traditional Cultural Properties Report, and overall impacts to Cultural Resources. Mr. Dutton's comments are addressed in Section 8 m. of the Final RROD.

(6) Newport News Consultant Dr. Thomas King: Dr. King commented on cultural resources issues, including Section 106 coordination, Traditional Cultural Properties and the "alleged sacred site." Dr. King's comments are addressed in Section 8 m. of the Final RROD.

(7) Newport News Consultant Malcolm Pirnie, Inc.: Letters were submitted by Bruce W. Schwenneker, R. Thomas Sankey and Kathryn B. Sweeney. They stated that the wetland mitigation plan developed for the proposed reservoir exceeds that required of other applicants and the Cohoke Creek wetlands are not of extraordinary value or unique in any way. They hypothesized that the reservoir project would prevent further loss of wetlands and other resources that would occur as a result of uncontrolled growth in the area. They stated that the Habitat Evaluation Procedure was not appropriately conducted. Specifically, they claim that the lake habitat was not properly evaluated and no credit was given for the reservoir and its shoreline. Finally, they commented that while the RROD states that one of Newport News' proposed mitigation sites may not be available as it has been proposed as a private mitigation bank, the bank may still be beneficial to the King William Reservoir Project. These comments were addressed in Section 8 f. of the Final RROD.

21. A Discussion of Conformity With the Guidelines Published for the Discharge of Dredged or Fill Material in Waters of the United States (40 CFR, Part 230): The placement of fill material in vegetated wetlands and free-flowing streams for the construction of the proposed impoundment of Cohoke Creek is considered a discharge of fill into waters of the United States. Therefore, an evaluation of the chemical and biological effects of the proposed fill activity was conducted in accordance with the 404 (b) (1) Guidelines formulated by the Environmental Protection Agency and published in Volume 45, Number 249 of the Federal Register, dated 24 December 1980.

Subpart C - Potential Impacts on Physical and Chemical Characteristics of the Aquatic Ecosystem:

Substrate: The proposed King William Reservoir would convert 21 miles of free-flowing streams, 403 acres of forested, scrub-shrub and emergent wetlands, and 34 acres of open water to a deep water man-made lake. Fill material for the construction of the dam itself would displace some wetlands, while most would be inundated by backflooding. However, the physical integrity, environmental characteristics and values of the entire 437-acre wetland/open water complex would be lost.

The placement of the pre-cast concrete outfall structure, riprap apron and the excavation of a discharge channel would displace only 0.15 acres of wetlands. However, the addition of an average of 32.6 mgd of flow to the channel of Beaverdam Creek would result in an average 7-fold sustained increase above existing average flow conditions. This increase would adversely and permanently change stream dynamics and stream morphology in the 0.8 miles of creek substrate below the outfall. This sustained increase in flow volumes would increase erosion rates, turbidity and subsequent deposition of highly erodible silt and organic materials downstream.

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The placement of a concrete foundation and riprap for the intake structure on the Mattaponi River would alter the substrate elevation of a small area and result in changes in water circulation and current patterns. The discharge of fill material to backfill the pipeline trenches for stream/wetland crossings would convert approximately 10.4 acres of forested wetlands to emergent and scrub-shrub wetlands. The affected area would still be vegetated wetlands if pre-disturbance contours are restored; however, there would be a loss of forested wetland function associated with a change in cover type from the clearing and continued maintenance of the utility corridor. This conversion would change the physical and biological characteristics of the wetland substrate and result in fragmentation of the forest habitat. Evaluating these conversion impacts as permanent wetland impacts is consistent with the District's current policy for utility line projects when wetland cover type conversions in easements will be continually maintained.

Suspended Particulates/Turbidity: Suspended particulates and turbidity would be temporarily elevated during construction of the dam in Cohoke Creek, the intake structure in the Mattaponi River, the outfall structure in Beaverdam Creek and the many stream/wetland pipeline crossings. However, a sustained increase in turbidity would be expected from the increased flow regime downstream of the outfall structure.

The placement of the proposed intake structure in the Mattaponi River would result in changes in water circulation and current patterns that may cause a minor change in erosion or accretion of the adjacent marshes and potentially affect suitable habitat for the federally listed threatened sensitive joint-vetch. The increased flow regime from the peak discharge of 50 mgd at the outfall in Beaverdam Creek would result in substantially increased erosion rates and scouring of the natural channel and wetlands along the affected 0.8 miles of the creek especially during periods of high natural flows.

The impoundment of the naturally flowing streams in Cohoke Creek would reduce the magnitude and duration of flood flows, interrupt downstream sediment and nutrient delivery and adversely affect the natural maintenance and expansion of downstream wetlands. Long-term reduction in sediment load would affect channel formation and nutrient cycling dynamics.

Water: Changes in temperature would be expected to result from the conversion of the upper Cohoke watershed from a natural, dendritic, riverine system with associated vegetated wetlands and forested riparian buffer to a large unshaded open water reservoir. Temperature influences the chemical properties of natural water bodies (e.g., amount of dissolved oxygen), which in turn can greatly limit the ability of plants and animals to utilize these waters.

The water intake structure on the Mattaponi River would withdraw up to 75 mgd of water from the river. A sustained withdrawal of such magnitude would result in increased salinity and other changes in chemical properties of the water that would have the potential for indirect ecological effects on plants and fish and wildlife resources in the river. Freshwater withdrawal may result in changes to water chemistry, including concentrations of macro-and micro-nutrients such as nitrogen, phosphorus, potassium, iron, cobalt and dissolved organic carbon as well as major inorganic elements such as chloride, sodium, magnesium, sulfate, calcium, and bicarbonate. No matter how slight the changes might be, they would be permanent and would have a long-term, additive effect on plant and animal resources in the Mattaponi River and could irreversibly alter the natural habitat of freshwater plants and animals. Long-term and indirect adverse impacts to water chemistry in the Mattaponi River could affect resources in the Pamunkey and York Rivers as well.

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Also, an additional 45 to 120 mgd pumpover from the Pamunkey River to augment the Mattaponi River withdrawal as described in the EIS should be viewed as a “reasonably foreseeable withdrawal” when considering cumulative impacts to the York River system from salinity intrusion. Although the City of Newport News stated that they had no immediate plans to pursue the second pumpover, they clearly have not abandoned the potential for such an option, as a Pamunkey River pump station is included in their agreement with King William County. This additional sustained withdrawal would result in further increases in salinity and other chemical changes and further ecological effects on resources in the Pamunkey, Mattaponi and York Rivers.

Lateral seepage from the reservoir due to the rise in the water table could recharge the Yorktown aquifer and benefit local private wells. However, potential effects on the quantity and quality of residential wells water has not been investigated.

Current Patterns and Water Circulation: The discharge would result in the following secondary effects to aquatic resources:

The proposed King William Reservoir would obstruct the natural flows from a large portion of the upper Cohoke Creek watershed, including headwater drainages and associated wetlands, and would significantly alter the water circulation patterns both upstream and downstream of the dam. The net reduction in freshwater discharge below the dam would restrict stream flows and impair the downstream transfer of sediments and detritus especially to those wetlands associated with the mainstem of Cohoke Creek located between the proposed dam and the existing Cohoke Millpond. Nitrogen and phosphorus loading concentrations are predicted to significantly increase over the current loading concentrations in the Cohoke Creek watershed.

Organic inputs and the processing of detritus would be severed for much of the Cohoke system, especially for those wetlands associated with the mainstem of Cohoke Creek downstream of the proposed dam and upstream of Cohoke Millpond.

The addition of an average of 32.6 mgd of flow to the channel of Beaverdam Creek would result in an average 7-fold sustained increase above existing flow conditions. This sustained increase would adversely and permanently change stream dynamics and stream morphology in the 0.8 miles of creek substrate below the outfall and would increase erosion rates, turbidity and subsequent deposition of highly erodible silt and organic materials.

The presence of the intake structure in the Mattaponi River would be an obstruction to flow that would alter current flow and circulation patterns and may affect shoreline erosion and accretion patterns in the immediate vicinity of the structure.

Normal Water Fluctuations: The reservoir would impound 21 miles of free-flowing stream and would reduce the downstream flow of Cohoke Creek to one third of its natural volume. The flow pattern of Cohoke Creek would be significantly and permanently altered and the downstream wetlands would be starved of the natural flows, as well as sediment and particulate organic matter (detritus) especially during peak flow events. Water level fluctuations and periodic drawdowns associated with reservoir operation would decrease the wildlife use and habitat value of any potential aquatic fringe.

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The sustained increase in flow events in the 0.8 miles of Beaverdam Creek below the outfall will occur at a frequency in orders of magnitude above natural conditions. The increased flows would adversely and permanently degrade channel morphology and would increase erosion rates, turbidity and subsequent deposition of highly erodible silt and organic materials. Decreased water quality from resulting turbidity would be detrimental to existing fish and invertebrate populations.

Salinity Gradients: The withdrawal of 75 mgd of water from the proposed intake structure would alter salinity gradients. A very small increase (0.1 to 0.2 ppt) in the mean annual salinity levels was predicted to occur as a result of the withdrawal and the VIMS report anticipated little or no upriver shifts in the distribution of existing wetland vegetation as a result of the predicted one kilometer upstream salinity shift. Although the actual salinity increase was predicted to be greater downstream, the percentage of change would be more significant upstream where the existing salinity approaches zero. While these increases might appear small, they would be sustained for as long as the withdrawal exists and would exacerbate any natural salinity increases during times of drought and/or during periods when the wind pushes the tidal water farther upstream. VIMS addressed only the predicted spatial distribution of existing wetlands, and did not evaluate the effects of the upstream salinity shift on any fish and wildlife resources or endangered and threatened plant or animal species.

Both the Fish and Wildlife Service and the Virginia Department of Conservation and Recreation indicated that some organisms and life stages have a low threshold for negative effects from chronic exposure to increased salinity or higher frequency of occurrence. During certain life stages, some species may be harmed by acute salinity impacts that would occur during maximum pumping events. Organisms in the low-salinity upper estuary may be particularly vulnerable to impacts from very slight changes in water chemistry as some of these freshwater and estuarine species may already be at the edge of their physiological tolerance. Even a change in salinity as slight as 0.1 ppt could cause a significant decrease in growth and reproduction for these organisms. Also, a variety of plant metabolic processes, including germination, nutrient uptake, productivity, seed production, and community establishment are known to be affected by salinity. Salinity is an important growth-limiting factor in wetland species and the effects of salinity on function and anatomy may vary during various plant developmental stages.

Subpart D - Potential Impacts on Biological Characteristics of the Aquatic Ecosystem:

Threatened and Endangered Species: In their Biological Opinion, the U. S. Fish and Wildlife Service concluded that flooding of the reservoir would eliminate a population of the federally listed threatened small whorled pogonia and that the construction and operation of the proposed intake structure on the Mattaponi River could result in indirect impacts to colonies of the federally listed threatened sensitive joint-vetch from erosion and sedimentation of sensitive joint-vetch beds. The Service believes that there is also the potential for cumulative indirect long-term impacts to various stages of the vetch's life cycle from changes in salinity and water quality, competition, loss of habitat, and introduced invasive species.

All of the known nests of the federally listed threatened bald eagle in the vicinity of the project are beyond the designated 0.25-mile radius buffer within which human activities could disturb eagles or degrade their habitat; therefore, the Service concluded that if noise disturbances are not excessive, the proposed reservoir construction would not be likely to adversely affect the bald eagle at the King William Reservoir Site. However, because bald eagles are particularly sensitive to noise and other disturbances from human activities, the construction of the pipeline would be incompatible with successful nesting and foraging. Both the Service and the Virginia Department of Game and Inland Fisheries recommended time

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of year restrictions to avoid disruption to bald eagles during the nesting season. Also, bald eagles may be present on some of the proposed wetland mitigation sites and along the re-aligned pipeline route.

The applicant has agreed to the Service's recommendations for the small whorled pogonia and three of the six recommendations for the sensitive joint-vetch. During informal consultation, the applicant had developed a management plan to minimize impacts to the bald eagle. However, in their Mitigation Program, Fish and Wildlife Mitigation Plan, their proposals for the sensitive joint-vetch and the bald eagle no longer include these measures. **In their comments on the RROD, the City of Newport News indicated that they are not opposed to the recommendations for bald eagle management outlined in the EIS and the Biological Assessment and they had assumed that the management strategies would be incorporated as permit conditions. If I were to issue a permit for the King William reservoir project, I would include these management measures for the bald eagle as conditions of the permit.**

The City also indicated that they are not opposed to the recommendations outlined in the Biological Opinion for the sensitive joint-vetch and assumed they would be incorporated as permit conditions. However, the City originally agreed to implement only three of the Service's six conservation recommendations for the sensitive joint-vetch. As one of the conservation recommendations, the Service recommended the adoption of the Modified 80% Exceedence flowby method for protection of the sensitive joint-vetch. The RRWSG refused to agree to this conservation recommendation as they intended to request that the MIF stipulated in the VWPP be changed to their proposed 40/20 Tennant MIF method when the permit is re-issued in 2007. The City of Newport News has not modified their joint permit application to include those conditions. The City's most recent statement that they are not opposed to the Service's conservation recommendations contradicts other statements made in response to the RROD regarding the flow-by requirements for the Mattaponi River. If I were to issue a permit for the proposed King William Reservoir, I would include all six of the Service's recommended measures for the sensitive joint-vetch as conditions of the permit.

The bald eagle was not included in the consultation under Section 7 of the Endangered Species because the Service's concerns over potential impacts to bald eagles were resolved through the informal consultation process. The Service concluded that neither the proposed action nor its cumulative effects are likely to jeopardize the continued existence of the small whorled pogonia and the sensitive joint-vetch. A "no jeopardy" opinion means that this one action alone would not lead to the extinction of the entire species, even though there may be harm, functional impairment or destruction of an individual population of the species.

The conclusions of the Secretary of the Interior under Section 7 of the Endangered Species Act concerning the impacts of the discharge of dredged or fill material on threatened and endangered species and their habitat are considered final for the proposed impact area. However, additional consultation may be required for the proposed mitigation sites and the re-aligned pipeline route.

Fish, Crustaceans, Mollusks and Other Aquatic Organisms in the Food Web: The inundation of wetlands and streams in the proposed reservoir pool area would eliminate habitat for wetland dependent fish and invertebrate species. Although the proposed King William Reservoir would provide spawning and nursery habitat for the resident fish species that are able to survive in that system, a conversion of the natural and productive riverine wetlands to an artificial and relatively unproductive open water habitat would lower species diversity and may lead to reduction in overall biological productivity. According to Dr. Greg Garman, non-native fish stocked in the King William Reservoir would very likely escape into

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the Pamunkey River, and could eventually become established in the Mattaponi River. These non-native fish could impact native fish in the rivers, including American shad, by predation and competition.

Impounding a large portion of the headwaters and associated riparian areas of Cohoke Creek would result in a severe alteration to the flow regime and would significantly reduce the amount of organics that are transported to, and support fish and aquatic organisms in the downstream portions of Cohoke Creek. The proposed reservoir and Mattaponi pumpover would result in elevated levels of dissolved nitrogen and phosphorus in the reservoir pool area and potentially to downstream portions of Cohoke Creek. In particular, the phosphorus concentration is estimated to increase by an order of magnitude, which could lead to problems with accelerated eutrophication within the proposed reservoir and downstream reaches of Cohoke Creek. Insufficient or poor quality water releases from the dam would affect the downstream habitat and inhabitants. Furthermore, construction of the 78-foot high dam would permanently block the potential restoration of anadromous fish passage on Cohoke Creek upstream of the proposed dam. The City of Newport News has conditioned their Development Agreement with King William County to reserve the wetlands between the KWR-IV and KWR-II dam sites for future downstream expansion of the reservoir. If permitted, a future reservoir expansion would destroy an additional 137 to 216 acres of wetlands and their associated fish and aquatic resources downstream of the currently proposed KWR-IV dam. Although the RRWSG offered to place temporary conservation easements over the wetlands between the proposed KWR-IV dam and upstream of the existing Cohoke Millpond as a part of their overall mitigation plan, they have not agreed to preserve these areas in perpetuity.

Changes in salinity levels of the Mattaponi River water as a result of the proposed raw water intake would affect adults, juveniles and eggs of fish, including shad and other anadromous fish. Some organisms and food particles smaller than 1 mm screen openings would be sucked into the intake and removed as a food source for fish and other aquatic organisms in the Mattaponi River. Such a loss would be expected to decrease the overall productivity of the riverine system.

As existing fish and invertebrate populations in Beaverdam Creek below the proposed outfall location are adapted to an average flow of less than 5 mgd, continuous flow events of 32.6 mgd or continuous peak flows of 54.5 mgd would likely change long-term species composition. Also, excessive turbidities would reduce water quality in the Diascund Reservoir and Diascund Creek and affect the anadromous fish that Diascund Creek supports.

Other Wildlife: Adverse impacts on aquatic wildlife habitat for resident and transient mammals, birds, reptiles and amphibians would result from the loss of approximately 403 acres of vegetated wetlands, 34 acres of shallow open water and 21 miles of stream corridor. The reservoir would flood a great blue heron rookery, numerous beaver ponds and large uninterrupted tracts of bottomland hardwood forests. Habitat that provides food and shelter as well as breeding and nesting sites, protective cover from predators and travel corridors for a wide variety of wetland dependent species would be eliminated. Many species inhabiting the flooded area would be forced to relocate to other areas of similar habitat, if available and not already at or near their carrying capacity. Less mobile species, including reptiles and amphibians, are not likely to be able to relocate to suitable habitat and would not survive.

Approximately 10.4 acres of forested wetlands along the pipeline route would be permanently converted to emergent or scrub-shrub wetlands which could result in fragmentation of habitat for some interior forest species. Reduced habitat from forest fragmentation could result in decreased breeding success and an overall population reduction. The right-of-way could also allow the introduction of edge species,

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which compete with or prey upon interior forest species. Furthermore, these disturbed areas may become dominated by more tolerant exotic and invasive species which would further degrade the wildlife habitat and overall biological productivity. Beaver ponds and a small great blue heron rookery could be adversely impacted by the construction and operation of the proposed outfall on Beaverdam Creek.

Subpart E - Potential Impacts on Special Aquatic Sites:

Sanctuaries and Refuges: No impacts are anticipated.

Wetlands: The proposed fill for the construction of the dam and backflooding of the reservoir pool area would result in the direct and permanent destruction of 403 acres of non-tidal vegetated wetlands, 34 acres of open water and 21 miles of perennial and intermittent stream channels. These aquatic resources have been identified as Aquatic Resources of National Importance (ARNI) by the U.S. Fish and Wildlife Service and EPA. The biological productivity, wildlife habitat, storm flood retention capacity and water quality buffering of these ecologically significant wetlands and floodplains would be permanently lost to the local ecosystem. The reservoir would convert 1,526 acres of a generally undisturbed, high quality, highly diverse and productive system of wetlands, forests and streams and their wildlife communities into a relatively monotypic, open-water lake environment favored by only a few lake-dependent species.

Roughly half of the total 17 square mile drainage area (8.9 square miles) would be affected by the impoundment, and the flow pattern of Cohoke Creek would be significantly and permanently altered. The net reduction in freshwater discharge below the dam would restrict stream flows to about one third of the existing average flow and would result in adverse impacts to the wetland vegetation and the fish and wildlife that Cohoke Creek and Cohoke Millpond support. Such a disruption in flow and circulation patterns could also result in major wetland losses through secondary impacts. The impoundment would result in the permanent alteration and potential degradation of 186 acres of wetlands and their associated wildlife habitat downstream of the proposed dam due to decreased inflow to the downstream wetlands, and significantly reduced export of particulate organic matter (detritus) which would be expected to adversely affect the natural maintenance of the downstream system. Additionally, the proposed reservoir and pumpover are predicted to increase loading of dissolved nutrients (nitrogen and phosphorus) which could accelerate eutrophication of downstream reaches and result in depletion of dissolved oxygen and other water quality problems. These changes would be expected to adversely affect the biological productivity of the downstream wetland system.

The permanent conversion of 10.4 acres of forested wetlands to emergent and/or scrub-shrub wetlands along the pipeline construction route would result in a reduction of forest patch size and fragmentation of habitat for some interior forest species. Reduced habitat from forest fragmentation could result in decreased breeding success and an overall population reduction. In addition, further degradation of wildlife habitat would occur if these disturbed areas become dominated by more tolerant invasive species such as common reed (*Phragmites australis*). Forest fragmentation would also decrease the habitat value of the remaining unaltered forest.

Another 0.15 acres of wetlands would be destroyed by the construction of the proposed outfall structure and excavation of a discharge channel on Beaverdam Creek. In addition, the sustained average 7-fold increase above existing flow conditions would adversely and permanently change stream dynamics. This change would increase erosion rates and result in wetland losses in the 0.8 miles of stream substrate

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below the outfall. Increased average stream flow conditions to 32.6 mgd would adversely impact wetland habitat, fish and benthic populations that are adapted to average flows of only 4.5 mgd.

The King William Reservoir itself could result in additional cumulative impacts through future expansion of the reservoir footprint. The City of Newport News has made plans to eventually expand the reservoir to either the KWR-II or the KWR-I dam location thereby impacting an additional 137 to 216 acres of wetlands to supply additional treated water and has reserved the lands between the KWR-II and KWR-IV dam sites for possible future downstream reservoir enlargement. Therefore, it appears that the City of Newport News intends to eventually apply for a permit to impact a total of 574 to 653 acres of wetlands for the King William Reservoir. These downstream wetlands closely resemble those in the proposed impoundment area and possess a high level of ecosystem diversity.

The withdrawal of 75 mgd of water from the proposed intake structure on the Mattaponi River has the potential to alter salinity gradients of the river water which would affect wetland vegetation. The proposed intake structure itself would alter current patterns and velocity and could increase erosion of wetlands along the shoreline. Although the increases in salinity and erosional effects are predicted to be small, these changes would have a long-term, additive effect on the diverse tidal freshwater marshes in the nearly pristine Mattaponi River and could irreversibly alter the natural habitat of freshwater plants and wildlife. The applicant's individual studies on salinity and erosion did not predict substantial direct impacts to the Mattaponi River and its resources from the single effects that they evaluated. However, these studies revealed the lack of information concerning combined and indirect adverse impacts that would occur from the additive effects of these changes. The magnitude of these effects is unknown, and cannot be accurately predicted, especially in conjunction with other projects that may follow.

Mud Flats: No impacts are anticipated.

Vegetated Shallows: No impacts are anticipated.

Coral Reefs: No impacts are anticipated.

Riffle and Pool Complexes: No impacts are anticipated.

Subpart F - Potential Effects on Human Use Characteristics:

Municipal and Private Water Supplies: The proposed King William Reservoir project would be highly beneficial to Newport News Waterworks and their customers. As hosts for the project, King William County and New Kent County have the option to receive 3 mgd and 1 mgd from the reservoir storage, respectively, should they choose to purchase the water and construct the necessary pipelines, treatment plants and transmission infrastructure.

However, the needs of other localities within the Mattaponi and Pamunkey River basins have not been considered or provided for by the RRWSG's plan. King and Queen County and Caroline County in particular have expressed concern that the withdrawal of so much water from the Mattaponi River would preclude their being able to obtain future water supplies from the river when their need arises.

Farmers who currently use Mattaponi River water for irrigation of their crops are concerned that any increase in salinity would make the water unusable for this purpose. Lateral seepage from the proposed

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King William Reservoir due to the rise in the water table could recharge the Yorktown aquifer and benefit local private wells.

Recreational and Commercial Fisheries:

Mattaponi River - The taking of American shad is prohibited to the general public in the Mattaponi River and the upper portions of the Pamunkey River due to depletion of stocks by over-fishing and habitat degradation; however, shad are commercially fished in the Chesapeake Bay. The Mattaponi and Pamunkey Tribes hold tribal fishery rights and are exempt from the state closure. The reproductive viability of American shad is of particular concern because shad populations have slowly but steadily declined over the past 100 years. State and federal agencies are currently involved in conservation efforts to restore habitat and increase populations; and hatcheries operated by the Mattaponi and Pamunkey Tribes on their reservations contribute to this effort. Traditional fisheries management has not been effective in expanding the shad populations, and researchers have acknowledged that the complex interactions of the complete ecosystem must be taken into account, and the critical stages of the shad's life cycle must be examined to determine what types of habitat are essential to reproductive success.

Many members of the Mattaponi Tribe depend on fish from the Mattaponi River for both their subsistence and as a source of income; therefore, adverse effects to anadromous fish would affect the economy of the Mattaponi Tribe. Also, any adverse effects to the reproductive success in the Mattaponi and Pamunkey Rivers would affect the economy of those depending on the commercial harvesting of shad in the Chesapeake Bay.

The potential for saltwater intrusion to decrease the tidal freshwater zone of spawning habitat on the Mattaponi River could impact populations of American shad in the Mattaponi and Pamunkey Rivers. American shad spawn only in freshwater (less than 0.5 parts per thousand salinity); therefore, any salinity changes associated with the withdrawals could affect where and when these fish spawn in the River. Research has shown that full development of salinity tolerance does not occur until the onset of the larval-juvenile metamorphosis (26 to 45 days from the egg stage); therefore, there would appear to be the potential for a reduction in the survival, development and growth of early life stages of shad as a result of salinity changes in the Mattaponi River. Adequate stream flows and natural hydroperiods need to be maintained during the summer months to protect the riverine and riparian habitat for juvenile fish.

The intake operation could result in fish mortality from entrainment and impingement of fish eggs and larvae. Some eggs and larvae that are impinged on the intake screens will be damaged or destroyed. Some eggs and juveniles of other fish species and food particles that are smaller than the one-millimeter screen openings could be pulled into the intake. This could result in a reduction of food supplies that are necessary for the survival and growth of juvenile shad and other anadromous fish populations in the Mattaponi River.

According to Dr. Greg Garman, who performed a limited study of the potential effects of the proposed withdrawal on anadromous fish in the Mattaponi River, "With a few exceptions, there existed only a very limited amount of biological or ecological information that can be used to make direct judgments concerning the likely impacts of the King William Reservoir on the ecologically and economically important anadromous clupeid populations of the Mattaponi River." Dr. Garman further stated that without the availability of such basic descriptive information as temporal and spatial distribution,

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spawning and early life history stages, it was very difficult to accurately assess the potential for ecological impacts from the proposed project.

Cohoke Creek - Limited fish surveys identified 38 species within the Cohoke Creek watershed. Construction of the dam and inundation of the pool area would impact fish species in Cohoke Creek through increased levels of suspended sediment and the elimination of substrate, benthic food organisms and vegetation for spawning, nursery and shelter. As the reservoir would be stocked with forage and game species, it would provide increased opportunities for recreational fishing, but would result in a significant change in the composition of the fish assemblage. The extent to which extirpation of native fishes will occur is unknown; however, it can be assumed that the establishment of a stocked freshwater fishery would not compensate for the impacts of the project to resident fisheries as asserted by the RRWSG. Although some fish species may be able to persist in the reservoir, others that rely on the flowing creek system would be eliminated through its conversion to a deep-water lake.

According to Dr. Greg Garman, non-native fish stocked in the King William Reservoir would very likely escape into the Pamunkey River, and could eventually become established in the Mattaponi River. These non-indigenous fish could impact native fish in the rivers, including American shad, by predation and competition.

Construction of the King William Reservoir would permanently block the potential passage of spawning anadromous and catadromous fish into the upper 21 miles of Cohoke Creek effectively precluding the future restoration of potential anadromous fish spawning habitat in that section of the Creek. The 1987 Chesapeake Bay Agreement has placed a special emphasis on the removal of blockages to anadromous fish and restoring historic spawning grounds.

Water Related Recreation: The discharge of fill for the construction of the dam and backflooding of the pool area would eliminate areas where recreational hunting and fishing as well as non-consumptive recreational uses such as hiking and bird watching currently take place. Recreational fishing in the privately owned 85-acre Cohoke Millpond could be impacted by siltation during reservoir construction and by long-term changes in water quality and quantity as a result of reduced flows. However, the 1,526-acre King William Reservoir would provide substantial water-related recreational opportunities for fishermen, sail boaters, canoeists, bird watchers, photographers, sightseers, and hikers. The proposed King William Reservoir would become the closest large lake available to the residents of the Middle Peninsula and Northern Neck and would be expected to be a substantial recreational benefit to the region.

Aesthetics: The Cohoke Creek watershed is relatively undisturbed except for silvicultural activities and to some is considered to possess natural scenic beauty. A dramatic shift in the scenic character of the area would occur from the replacement of this forest/wetland system with a deep-water man-made lake. To those who enjoy the natural aquatic ecosystem, the reservoir would be considered an inappropriate development that would destroy the vital elements which contribute to the compositional unity, distinctiveness and diversity of the area. Also, the planned recreational and residential development in and around the reservoir would be considered by some as encouraging incompatible human access to an otherwise undisturbed area. From the unique perspective of the native Americans living in the area, the reservoir would reduce the spiritual value of the aquatic area and destroy the quality of life enjoyed by their people for centuries. However, because aesthetic values vary with individual taste, others would consider the new open-water habitat and recreational and residential uses as an aesthetic resource. Short-term water quality and air quality impacts would occur during land clearing and construction disturbances. Construction activities and transportation of workers and materials to the site would

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increase noise levels at the reservoir project site. A long-term increase in ambient noise levels would result from the operation of the reservoir pumping station. Odor would be a problem when the reservoir is severely drawn down and anaerobic sediments are exposed.

According to The Nature Conservancy, the freshwater tidal ecosystem of the Mattaponi River is one of the most pristine on the Eastern Seaboard and it is considered by the Virginia Department of Conservation and Recreation to be one of the most significant natural habitats in the eastern United States. A segment of the Mattaponi River has been evaluated and determined to qualify as a Virginia Scenic River, and the state has determined that other segments should be evaluated to determine their suitability as a Virginia Scenic River. The Mattaponi River supports state-significant and exemplary freshwater tidal marshes and swamps and provides important habitat for rare species such as the sensitive joint-vetch and the bald eagle. The intake pump station structures and the surrounding cleared areas would disrupt the pristine nature of the shoreline when viewed from the river. Construction activities would temporarily increase noise levels, and the pump station operation would result in a long-term increase in ambient noise levels.

The Mattaponi Tribe has a unique cultural perspective of the Mattaponi River that goes beyond aesthetics. The Mattaponi people believe that the Mattaponi River is more than a simple body of water. To them, it is a spiritual place that unites tribal members through baptism and other religious ceremonies. The Mattaponi Tribe claims that alterations to the natural state of the river would compromise the sanctity of these religious ceremonies. They believe that the river is a gift of life from the Great Spirit that provides and completes the circle of life. The Tribe believes that to defile the Mattaponi River would be to dishonor the Tribe's ancestors and Mother Earth.

Parks, National and Historical Monuments, National Seashores, Wilderness Areas, Research Sites and Similar Preserves: No impacts are anticipated.

Subpart G - Evaluation and Testing:

General Evaluation of Dredged or Fill Material: The proposed fill for the construction of the earthen dam would be obtained from soils in a borrow area adjacent to the proposed reservoir. This material would consist of sand and clay and is not likely to be a carrier of contaminants; therefore, no further testing is required. The proposed concrete and riprap structures at the intake and outfall locations would also be composed of naturally occurring and inert material unlikely to be a carrier of contaminants.

Chemical, Biological and Physical Evaluation and Testing: The dredged or fill material is unlikely to be a carrier of contamination and is, therefore, excluded from the evaluation procedures.

Subpart H - Actions to Minimize Adverse Effects:

Actions Concerning the Location of the Discharge: The location of the proposed dam was moved upstream twice, thereby reducing the wetland impacts on Cohoke Creek by a total of 216 acres. The outfall location was moved downstream another 0.5 miles, thereby reducing the impacted section of Beaverdam Creek streambed to 0.8 miles. Also, the pipeline route was realigned to reduce the number of wetland/stream crossings.

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Actions Controlling the Material After Discharge: The applicant has proposed a riprap apron to prevent scour at the end of the outfall on Beaverdam Creek and riprap toe protection and landscaping of the dam on Cohoke Creek to reduce erosion of the earthen fill material.

Actions Affecting the Method of Dispersion: The proposed intake structure on the Mattaponi River would be oriented parallel to the natural flow of the river to minimize the obstruction to water current or circulation patterns, thereby reducing turbulence and shoreline erosional impacts.

Silt curtains and diversion structures for stream crossings, and standard erosion and sedimentation control measures to minimize the adverse impacts associated with construction would be automatically included as special conditions of any Corps permit to confine suspended particulate materials and prevent point and non-point sources of pollution.

Actions Related to Technology: Wedge wire screens would be installed on the Mattaponi River raw water intakes as protective devices to reduce impacts to fish eggs and larvae. The pipeline crossing of the Pamunkey River would be accomplished by the directional drilling technique to reduce and/or avoid disturbance to the river bottom.

Actions Affecting Plant and Animal Populations: The dam location was moved 1.7 miles upstream of the original dam site in order to avoid direct impacts to a bald eagle nest and the outfall location was moved downstream 0.5 miles, thereby reducing the impacts to fish and aquatic resources. The intake was designed to incorporate wedge-wire screens with one-millimeter screen openings and entrance velocities not to exceed 0.25 feet per second to minimize entrainment and impingement of fish eggs and larvae. The operation and maintenance of intake screens would minimize the need for backflushing and use of chemicals to eradicate mussels.

The applicant has developed a wetland mitigation plan for replacement of wetlands that would be destroyed by the proposed discharge on a 2 to 1 acreage basis. A complete review of the plan indicates that the proffered acreage may fall short of full 2 to 1 replacement. In addition, the plan does not provide full in-kind replacement of the wetland functions that would be lost.

The Corps of Engineers does not have jurisdiction over the uplands that would be lost and cannot require mitigation for upland impacts as a part of the public interest review. However, the HEP and other functional assessments emphasize how the adjoining uplands complement the functions of the Cohoke Creek Wetlands. The applicant has included upland buffers in their wetland mitigation plan to partially offset the adverse impacts.

The applicant agreed to the Service's conservation recommendation of preserving a known colony of the federally listed threatened small whorled pogonia in order to minimize the impacts of the proposed action on the species. Six conservation recommendations were made by the Service in their Biological Opinion to protect the federally listed threatened sensitive joint-vetch populations that may be affected by the proposed action. The RRWSG agreed to only three of the conservation recommendations, as they believe that the impacts to the sensitive joint-vetch habitat from the construction and operation of the intake at Scotland Landing would be negligible. Although the RRWSG originally proposed a management plan to minimize potential impacts to both existing and newly established nests of the federally listed threatened bald eagle during construction and operation of the pipeline and reservoir, there is no mention of these

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management measures in their Final Mitigation Program, Fish and Wildlife Mitigation Plan; therefore, it appears that the applicant no longer proposes these measures. In their comments on the RROD, the City of Newport News indicated that they are not opposed to the recommendations for bald eagle management outlined in the EIS and the Biological Assessment and they had assumed that the management strategies would be incorporated as permit conditions. They also indicated that they are not opposed to the recommendations outlined in the Biological Opinion for the sensitive joint-vetch and assumed these would likewise be incorporated as permit conditions. However, the City's statement concerning recommendations for the sensitive joint-vetch contradicts other statements made in response to the RROD regarding the flow-by requirements for the Mattaponi River. If I were to issue a permit for the proposed King William Reservoir, I would include all six of the Service's recommended measures for the sensitive joint-vetch as well as the management strategies for the bald eagle as conditions of the permit.

Actions Affecting Human Use: The applicant proposes to implement architectural and landscaping treatments that would minimize pumping noise and visual impacts at the raw water pumping station on the Mattaponi River. Also, upon completion of dam construction, the earthen structure would be landscaped to minimize visual impacts. In order to reduce damage to Mattaponi Tribal fishing nets from pleasure boaters on the Mattaponi River, the applicant offered to ensure that King William County would not include a boat ramp at their proposed recreation area on the remainder of the Mattaponi River pump station property.

Other Actions: The applicant has proposed a schedule for downstream releases from the dam that they believe would accommodate the needs of wetlands, fish and wildlife in Cohoke Creek downstream of the proposed dam. The applicant has proposed the use of the 40/20 Tennant Minimum Instream Flow Method that they believe would be protective of fish and wildlife resources in the Mattaponi River. The applicant has developed a wetland mitigation plan that they believe would more than offset the adverse impacts to wetlands in Cohoke Creek. While I consider these actions to be an impressive attempt to minimize some of the adverse impacts associated with the project, I do not agree that they would completely accomplish that goal. My concerns on the shortcomings of each of these plans and recommendations for improvements are contained elsewhere in this document.

The applicant participated in the development of a long-term River Monitoring Plan to analyze pre and post-construction conditions in the Mattaponi River and Cohoke Creek. The applicant participated in the Habitat Evaluation Procedures Study to quantify anticipated habitat impacts on the reservoir project site and to determine whether the proposed compensatory mitigation would offset the anticipated habitat impacts.

Subpart B - Compliance with the Guidelines:

Restrictions on Discharge:

Alternatives Restriction (§ 230.10(a)): No discharge of dredged or fill material into a water of the United States shall be permitted if there is a practicable alternative that would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences. Construction of the King William Reservoir dam in Cohoke Creek and its adjacent wetlands would constitute a discharge of fill material into a water of the United States. This Record of Decision has shown that other alternatives, or combinations of alternatives, would be practicable alternatives. These practicable alternatives would be reasonably available to the applicant and would

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satisfy the applicant's overall purpose (to satisfy the water supply needs of the localities in the Regional Raw Water Study Group service area through the year 2050). These alternatives would also have less adverse impact on the aquatic ecosystem. As explained in the 6 February 1990 EPA/Corps Mitigation Memorandum of Agreement, "Compensatory mitigation may not be used as a method to reduce environmental impacts in the evaluation of the least environmentally damaging practicable alternatives for the purposes of requirements under Section 230.10(a)." Therefore, for this restriction, the environmental impacts of the proposed King William Reservoir project must be assessed without considering the applicant's compensatory mitigation plan. For these reasons, the King William Reservoir project fails the Alternatives Restriction.

Other Program Restrictions (§ 230.10(b)): No discharge of dredged or fill material shall be permitted if it causes or contributes to violation of any applicable state water quality standard, violates any applicable toxic effluent standard, jeopardizes the continued existence of any species listed as threatened or endangered under the Endangered Species Act of 1973, or violates any requirement imposed by the Secretary of Commerce to protect any designated marine sanctuary. The King William Reservoir passes the Other Program Restriction.

Significant Degradation Restriction (§ 230.10(c)): No discharge of dredged or fill material shall be permitted if it would cause or contribute to significant degradation of the waters of the United States. In the context of this restriction, effects contributing to significant degradation must occur in one or more specific areas, including: fish; wildlife; special aquatic sites (including wetlands); life stages of aquatic life and other wildlife dependent on aquatic ecosystems; aquatic ecosystem diversity, productivity, and stability; loss of fish and wildlife habitat; or loss of capacity of a wetland to assimilate nutrients. For purposes of the Significant Degradation Restriction, the net impacts of a project are assessed (including any compensatory mitigation). As stated in this Record of Decision, the applicant has proposed an impressive wetland mitigation plan and impacts to other resources would be reduced either by project modifications already agreed to by the applicant or that would be imposed as permit conditions. However, the wetland mitigation plan falls short of fully offsetting the project's impacts (see below). Although certain other impacts would also be reduced or offset, the overall effect of the project, from the standpoint of the factors listed herein and discussed elsewhere (including cumulative impacts as discussed in Section 13, above), would be to cause significant degradation to waters of the United States. The King William Reservoir project fails the Significant Degradation Restriction.

Minimization Restriction (§ 230.10(d)): No discharge of dredged or fill material shall be permitted unless appropriate and practicable steps have been taken to minimize potential adverse impacts to the aquatic ecosystem. The EPA/Corps Mitigation MOA specifies that "The determination of what level of mitigation constitutes "appropriate" mitigation is based solely on the values and functions of the aquatic resource that will be impacted." What is 'practicable', in this context, is what is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes. The wetland mitigation plan proposed by the applicant is the largest ever proposed in Virginia, but the King William Reservoir project would also constitute the largest wetland impact ever permitted in Virginia. The HEP study discussed elsewhere in this Record of Decision shows that the wetland mitigation plan would not appropriately mitigate the aquatic ecosystem habitat functions and values which would be lost due to the project. Also, this Record of Decision shows that there are uncertainties, risks, and other drawbacks to several of the proposed wetland mitigation areas, making their complete success uncertain. In addition, the applicant has proposed to preserve the 186 acres of wetlands downstream from the proposed dam as part of their mitigation plan, but has not agreed to protect this

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acreage by restriction or covenant from future degradation or destruction. Finally, impacts to Beaverdam Creek and its wetlands could be avoided by the practicable alternative of extending the pipeline and outfall into Diascund Reservoir. For each of these reasons, I find that appropriate and practicable steps to minimize potential adverse impacts to the aquatic ecosystem have not been taken. The King William Reservoir project fails the Minimization Restriction.

Factual Determinations (§ 230.11): In light of Subparts C through F, I have evaluated the potential short-term and long-term effects of the proposed discharge on the physical, chemical and biological components of the aquatic environment. I have considered the actions to minimize impacts (Subpart H) in making this determination. I have determined that both individually and cumulatively, the proposed discharge would cause or contribute to significant degradation of the waters of the United States. I have also determined that secondary effects associated with the discharge have the potential to result in significant degradation of the aquatic ecosystem.

Findings of Compliance or Non-compliance with the Restrictions on Discharge (§ 230.11): I have determined that the proposal does not represent the least environmentally damaging practicable alternative as other practicable alternatives to the proposed discharge that would have less adverse effect on the aquatic ecosystem are available to the applicant. The proposed King William Reservoir project fails three of the four restrictions on discharge.

I have determined that the proposed discharge will result in significant degradation of the aquatic ecosystem under Section 230.10 (c). The aquatic resources that would be impacted by the proposed King William Reservoir have been identified as Aquatic Resources of National Importance (ARNI) by the U.S. Fish and Wildlife Service and EPA. The project would result in adverse effects to fish, wildlife and special aquatic sites, has the potential for significant effects on life stages of aquatic life and other wildlife dependent on the aquatic ecosystem, would have significant effects on the diversity, productivity and stability of the ecosystem, would represent a significant loss of fish and wildlife habitat and has the potential to significantly affect the economy of the Mattaponi Indian Tribe.

The proposed discharge does not include all appropriate and practicable measures to minimize potential harm to the aquatic ecosystem. The applicant has developed a wetland mitigation plan focusing on 2 to 1 acreage replacement; however, the plan falls short of the goal of in-kind replacement of wetland functions and may fall short of full 2 to 1 replacement as well. The applicant has agreed to many, but not all, of the recommendations of the District and the federal advisory agencies to avoid and minimize adverse impacts to fish and wildlife resources. I have determined that the proposed discharge would cause or contribute to significant degradation of the waters of the United States. Because of the individual and cumulative adverse environmental impacts associated with the project and the lack of need to destroy wetlands when viable alternatives exist, I have determined that the proposed discharge of fill material does not comply with the Environmental Protection Agency's 404 (b)(1) Guidelines.

22. Conclusions: I have found that the combined adverse impacts of the proposed King William Reservoir project would cause or contribute to significant degradation of the waters of the United States, including wetlands (40 CFR 230.10 (c)), specifically in Cohoke Creek and the Mattaponi River.

The proposed King William Reservoir would displace not only wetlands, but also a complex landscape of wetlands and upland communities. The project would result in the irreversible and irretrievable loss of 403 acres of vegetated wetlands, 34 acres of shallow open water, 21 miles of free-flowing streams, and

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1,089 acres of adjacent and interspersed upland habitat. The aforementioned aquatic resources have been identified as Aquatic Resources of National Importance (ARNI) by the U.S. Fish and Wildlife Service and EPA. A large, diverse complex of wetland and upland habitats including beaver ponds, highly productive emergent and scrub-shrub wetlands, stream bottom and riparian wetlands as well as areas of mature forest would be transformed into a monotypic lake environment favored by only a few species. The existing diverse habitat of the Cohoke Creek watershed supports a wide array of aquatic, semi-aquatic and terrestrial wildlife and the low-gradient system serves an important role in maintaining water quality. The RRWSG's claim that the Cohoke Creek wetlands are not valuable or highly diverse is contrary to the results of their own studies as well as the opinions of many experts. Functional assessments performed in support of the project have actually demonstrated that these wetlands provide services to the Cohoke watershed that cannot be replaced by the proposed offsite compensation or the reservoir itself.

Approximately 1,526 acres of wildlife habitat within KWR-IV pool area would be converted to open water. Terrestrial and wetland-dependent wildlife would be affected by the inundation of wetland and forested areas. The reservoir would flood a great blue heron rookery, numerous beaver ponds and large uninterrupted tracts of bottomland hardwood forests thereby eliminating feeding, breeding and migration habitat for wetland dependent species. Many species inhabiting the flooded area would be displaced to other areas of similar habitat, if available. If neighboring habitats are at or near their carrying capacity for a particular species, the competition for available food supply would result in malnutrition and mortality and an overall reduction of the population of that species in the area. Less mobile species and species dependent on large contiguous habitats would be the most affected by the reservoir construction. Reptiles, amphibians and some small mammals would be less likely to relocate unless suitable habitat is available immediately adjacent to the pool area. These individuals would not survive. Some aquatic fringe would most likely become established around the reservoir; however, the fringe would provide less diversity of habitat and would not replace the functions in the existing Cohoke Creek system. Furthermore, water level fluctuations and periodic drawdowns associated with reservoir operation would decrease the habitat value and use of the aquatic fringe by wildlife. Reduction in habitat would also affect temporary resident species such as neotropical migratory songbirds that rely on large areas of temperate forest for breeding. The primary adverse impacts to wildlife habitat from the construction of the reservoir would likely be followed by similar secondary losses of wildlife habitat from the planned residential and recreational development around the reservoir.

Roughly half of the total 17 square mile drainage area (8.9 square miles) would be affected by the impoundment and the flow pattern of Cohoke Creek would be significantly and permanently altered. The net reduction in freshwater discharge below the dam would restrict flows to about one third of the existing average flow and would impair the downstream transfer of sediments and detritus. The proposed reservoir and pumpover is predicted to significantly increase loading of dissolved nutrients (nitrogen and phosphorus) within the reservoir pool area and potentially downstream over current loading rates in the Cohoke Creek system. An additional 186 acres of seasonally-flooded to permanently-flooded wetlands between the currently proposed KWR-IV dam location and the upper reaches of Cohoke Millpond would be indirectly affected by reduced flows. These wetlands are supported by hydrologic input from above the proposed dam location and would change in character and/or be reduced in acreage by the almost two-thirds reduction in flow volume.

An estimated 10.4 acres of wetlands would be impacted along the pipeline construction route. Since reforestation of the pipeline right-of-way would be suppressed to provide maintenance access, palustrine

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forested wetlands along the pipeline would be permanently converted to palustrine emergent or scrub-shrub wetlands and could result in a reduction in forest patch size and fragmentation of habitat for some interior forest species. Reduced habitat from forest fragmentation results in decreased breeding success and an overall population reduction. The right-of-way would also allow the introduction of edge species, which compete with, or prey upon interior forest species. Furthermore, these disturbed areas may become dominated by more tolerant exotic and invasive species such as common reed (*Phragmites australis*), the establishment of which would further degrade the wildlife habitat.

Also, approximately 0.15 acres of wetlands would be impacted by the proposed outfall structure on Beaverdam Creek. Operation of the pumpover with a sustained average 7-fold increase above existing flow conditions in Beaverdam Creek would adversely and permanently change stream dynamics and stream morphology. Increasing the average stream flow conditions from 4.5 mgd to 32.6 mgd would generate unacceptable levels of sustained flow volume on downstream aquatic resources, including vegetated wetlands, fisheries and benthic populations. Sustained flow volumes would increase rates of erosion and subsequent deposition of highly erodible materials such as organics and silts, and would potentially decrease water quality downstream to Diascund Creek Reservoir. The relocated outfall structure could also adversely impact a nesting population of the great blue heron, a species protected under the Migratory Bird Treaty Act. Construction and operation of the outfall structure and channelization of 150 linear feet of vegetated wetlands directly beneath the small rookery could result in unnecessary and, therefore, unacceptable impacts to the rookery.

The RRWSG has attempted to show that their mitigation proposal would fully replace the lost functions and values; however, their documentation indicates that their plan would not meet full functional replacement. Even though the applicant has made an impressive effort to minimize and compensate for the wetland loss, the net loss would still represent a significant degradation to waters of the United States and a significant loss of wildlife habitat. I agree that if fully successful, the proposed plan would replace the acreage amounts of lost wetlands. However, I cannot agree that the proposed plan would fully offset all of the impacts associated with the loss of an integrated, mature wetland habitat such as is found in the Cohoke watershed. The mitigation sites may provide wetlands of the same Cowardin classification as the impacted areas, but they would mostly function as depressional wetlands supported by runoff and precipitation unlike the wetlands of the free-flowing riverine system in Cohoke Creek. Furthermore, the project represents the loss of not only wetlands, but also a complex landscape of wetlands and upland communities that form an entire ecosystem. It is not possible to replicate the ecology and diversity of an entire integrated system of wetlands, streams, ponds, and forests in scattered mitigation sites throughout several small watersheds. The functions and values of the complex mosaic of habitats that would be lost cannot be replaced in fragmented and segregated compensation sites, even at a 2 to 1 ratio.

Historically, many efforts to re-create wetlands, especially forested wetlands, have proven less than fully successful. Also, because forested wetlands take 20 to 40 years or more to mature and the source of hydrology may not be guaranteed for that length of time, it is not possible to accurately predict to what degree the mitigation areas would provide successful and appropriate compensation. Furthermore, I have found that the Final Mitigation plan could actually fall short by as much as 431 acres due to the questionable feasibility of the Townsend site, problems with the designs of the Terrell and Taliaferro sites, and due to changes in the conceptual plans that appeared in the Final Wetland Mitigation Plan for the Gulasky, Lanesville, and Meadow Farm C sites.

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As a part of their mitigation plan, the RRWSG has offered to place temporary conservation easements over 186 acres of stream corridor wetlands and 620 acres of adjoining upland habitat located downstream of the proposed King William Reservoir dam and upstream of the existing Cohoke Millpond. However, the RRWSG has not agreed to preserve these areas in perpetuity and a clause in the City of Newport News' Development Agreement with King William County reserves the wetlands between the KWR-IV and KWR-II dam sites for future downstream enlargement of the reservoir. If permitted, a future reservoir expansion would destroy additional wetlands downstream of the currently proposed KWR-IV dam. Also, an additional 45 to 120 mgd pumpover from the Pamunkey River to augment the Mattaponi River withdrawal as described in the EIS should be viewed as a "reasonably foreseeable withdrawal" when considering long-term cumulative impacts to the York River system and its fish and wildlife resources from salinity intrusion. In the City's Development Agreement with King William County, a Pamunkey River pump station is included to provide a second pumpover to the proposed King William Reservoir as a way to enhance the safe yield of the reservoir and to supply additional water to as yet unidentified users. The combined effect of the proposed 75 mgd withdrawal from the Mattaponi River and the potential 45 to 120 mgd withdrawal from the Pamunkey River on the freshwater input to the Chesapeake Bay is also of concern.

In their Biological Opinion, the U. S. Fish and Wildlife Service concluded that neither the proposed action nor its cumulative effects are likely to jeopardize the continued existence of the two federally listed threatened plant species, the small whorled pogonia and the sensitive joint-vetch. However, a "no jeopardy" opinion does not mean that the proposed work will not affect listed species. Rather, it means that this one action alone would not lead to the extinction of the entire species, even though there may be harm, functional impairment or destruction of an individual population of the species. I disagree with the applicant's contention that the small whorled pogonia no longer exists within the proposed reservoir pool area, and I have concluded that the proposal would result in direct adverse impacts to a colony of the small whorled pogonia which would be lost due to flooding. The applicant has agreed to the Service's conservation recommendation for the small whorled pogonia. Also, the Service concluded that the project could result in detrimental effects on the sensitive joint-vetch colonies in the vicinity of the proposed raw water intake structure on the Mattaponi River and outlined six conservation recommendations to minimize or avoid adverse effects to these populations. The applicant has only agreed to implement three of the Service's six conservation recommendations. **In their comments on the RROD, the City of Newport News indicated that they are not opposed to the recommendations outlined in the Biological Opinion for the sensitive joint-vetch and assumed they would be incorporated as permit conditions. However, their statement concerning the recommendations for the sensitive joint vetch contradicts other statements made in response to the RROD regarding the flow-by requirements for the Mattaponi River.** With the exception of the number of colonies to be monitored, I agree with the need to implement all six of the Service's conservation recommendations for the sensitive joint-vetch. I have concluded that without implementation of these recommendations, the construction and operation of the intake has the potential to result in indirect impacts to sensitive joint-vetch colonies in the vicinity of the intake. **If I were to issue a permit for the proposed King William Reservoir, I would include all six of the Service's recommended measures for the sensitive joint-vetch as permit conditions.**

During informal consultation for endangered species under Section 7 of the Endangered Species Act, discussions over management issues for the bald eagle took place between the applicant, the District and the Service. The Service had provided recommendations for reducing impacts to bald eagles and they were addressed by the applicant's management plan contained in the District's January 1998 Biological Assessment. In this plan, the RRWSG incorporated the Service's recommendations to minimize potential

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impacts to both existing and newly established eagle nests during construction and operation of the pipeline and reservoir. Therefore, the Service indicated that their concerns over potential impacts to bald eagles were resolved through the informal consultation process, and the bald eagle did not need to be included in the formal consultation process. However, there is no mention of these management measures in the RRWSG's October 1999 Mitigation Program, Fish and Wildlife Mitigation Plan. I have concluded that without implementation of these management measures, the construction and operation of the pipeline and reservoir may affect nests of the bald eagle and would require further consultation with the U. S. Fish and Wildlife Service under Section 7 of the Endangered Species Act. **In their comments on the RROD, the City of Newport News indicated that they are not opposed to the recommendations for bald eagle management outlined in the EIS and the Biological Assessment and they had assumed that the management strategies would be incorporated as permit conditions. If I were to issue a permit for the proposed King William Reservoir, I would include the management strategies for the bald eagle as permit conditions.**

However small the predicted increase in salinity and erosional effects may be, they would have a long-term, cumulative effect on plant and animal resources in the Mattaponi River and would alter the natural habitat of freshwater plants and wildlife on which the Mattaponi Tribe depends for their livelihood. The magnitude of these effects is unknown, and cannot be accurately predicted, especially in conjunction with other projects that may follow. While the applicant's individual studies on salinity and erosion do not predict substantial direct impacts to the Mattaponi River and its resources, I disagree that these limited studies of single effects justify the RRWSG's broad conclusions, especially since they do not account for the additive effects of these changes.

The project has the potential to result in ecological impacts to anadromous fish populations in the Mattaponi River. According to the RRWSG's own consultant who performed the limited study of the potential effects of the proposed withdrawal on anadromous fish in the Mattaponi River, "With a few exceptions, there existed only a very limited amount of biological or ecological information that can be used to make direct judgments concerning the likely impacts of the King William Reservoir on the ecologically and economically important anadromous clupeid populations of the Mattaponi River." Despite a lack of such basic descriptive information on temporal and spatial distribution, spawning and early life history stages of American shad in the Mattaponi River, the RRWSG has concluded that there would be no significant effect. I disagree and concur with the U. S. Fish and Wildlife Service that the project could impact American shad. The applicant's limited study concluded that there would not be significant and detrimental impacts to migratory fish populations in the Mattaponi River as a direct result of the construction and operation of the King William Reservoir. However, the study did not consider the potential for indirect ecological effects as the result of physicochemical changes on fish assemblages.

Disruption of the Mattaponi Tribe's shad fishery and hatchery operation would represent a major cultural loss and a potential economic loss to the Tribe. It is true that despite the best efforts of the state and the Tribes, the shad population may continue to decrease even without the proposed water withdrawal for the reservoir. However, it must be taken into account that the complex interaction of numerous chemical and physical effects including the small increase in salinity that would result from the removal of up to 75 mgd of freshwater from the Mattaponi River has the potential to further degrade the already depleted shad population. As the Mattaponi Tribe depends on these fish for their livelihood, I cannot justify the further degradation or potential loss of this resource.

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Because of the project's potential to impact these resources, the District staff developed monitoring protocols that would be included as a condition of a permit, if one were to be issued, to provide long-term data gathering and analysis. Conclusive evidence would not be available until the various monitoring efforts and studies had been completed many years after the project is built. However, no matter how thorough such a monitoring plan may be, and how rapid the response to correct a problem that arises, some effects may not become apparent until the damage is already done and some adverse impacts may be irreparable.

I have determined that the applicant's proposed use of the 40/20 Tennant Minimum Instream Flow Method would not be sufficient to eliminate impacts to anadromous fisheries, wetlands, threatened species or water quality. Therefore, I have determined that it would be prudent to require the more protective Modified 80% Exceedence for the withdrawal rules in the Mattaponi River if a Corps permit were issued.

There would be no adverse impacts to navigation in the Mattaponi River and the King William Reservoir would provide a net benefit to recreational boating in King William County. Recreational boating and fishing opportunities would be increased by the presence of a 1,526-acre man-made lake. The proposed reservoir would become the closest large lake available to the residents of the Middle Peninsula and Northern Neck and would be expected to be a substantial recreational benefit to the region. However, as there are already many other opportunities for recreational boating and fishing in the area, I do not find this factor particularly persuasive.

The project would adversely affect 115 archaeological sites, 72 to 79 of which are potentially eligible for inclusion in the National Register of Historic Places. The reservoir would be located between Virginia's only two American Indian Reservations, and the proposed intake would be constructed approximately three **linear miles (or 5.5 river miles)** upstream of the Mattaponi Reservation. The project has the potential to impact a sacred site, traditional hunting, fishing, trapping, gathering and religious practices, subsistence fisheries, and the way of life of the Mattaponi, Pamunkey and Upper Mattaponi Indian Tribes.

The construction of the reservoir would result in a direct loss of hunting, trapping and gathering habitat and indirect impacts to the remaining area for game from overcrowding and competition for food. The increased recreational activities provided by the man-made lake and the planned residential and light commercial construction around the reservoir would result in a secondary loss of habitat on which traditional tribal uses would occur. This development would further reduce the land available to the tribes for hunting, trapping and gathering and additional recreational boat traffic on the Mattaponi River would interfere with traditional net fishing. The Mattaponi and Pamunkey Tribes have a spiritual connection to the Rivers, which are not only vital to their economy but are essential to their historical and cultural identity. The importance of the natural resources of Pamunkey Neck to the livelihood of Native Americans emphasizes the significance of the impacts.

Construction of the proposed King William Reservoir project would have a combined adverse impact on the natural and physical environment that would significantly and adversely affect the Mattaponi, the Upper Mattaponi and the Pamunkey Tribes. The cultural, social, economic and ecological impacts to the Tribes are interrelated to the adverse impacts to the natural and physical environment that would result from the project. The overall environmental effects of the project would be significant and would have an adverse impact on the Tribes that appreciably exceeds the effects on the general population. Therefore, the project would result in disproportionately high and adverse environmental effects to this minority

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population as described by Executive Order 12898. I have concluded that the risk to the culture and economy of the tribes, and to the Mattaponi Tribe in particular, would be significant. The Tribes cannot be fully compensated for the losses to their spiritual connections, culture and traditional socioeconomic practices that they would experience as a result of the construction of the reservoir and the withdrawal of water from the Mattaponi River.

The Corps' Institute for Water Resources concluded that unless the region suffers a drought more severe than any recorded in the twentieth century, the RRWSG has enough water through about 2015 even without using drought curtailment or dipping into the lower third of their existing reservoir storage. Therefore, there is no risk of shortage through 2015 with existing supplies. The IWR panel estimated that using 33% dead storage and no drought curtailment, the region will need more water beyond 2015 in order to have a zero risk of shortage. By 2020, there is a less than 4% risk of a maximum 11 mgd shortage if water use is the highest expected, groundwater yields are the lowest expected, and there is a recurrence of the worst drought of the twentieth century. By 2030, the risk is about 7% for a maximum 17 mgd shortage. The risk increases to 12% for a maximum shortage of 25 mgd by 2040. In the year 2050, there is about a 17% risk of a maximum shortage of 32 mgd of water. The risk of shortage means the risk of needing to use drought curtailment, not that the region would run out of water.

Newport News Waterworks' proposal to cease withdrawals at 33% of total storage volume in their existing reservoirs is arbitrarily and unnecessarily conservative, and unreasonably inflates their apparent deficit. Newport News Waterworks would use drought curtailment if needed during a drought as they have in the past and as any prudent utility would. Building the King William Reservoir would likely push the need for doing so again far into the future (barring emergencies), but at a significant environmental, social, and economic cost. I acknowledge the Virginia Department of Health's policy that utilities should not include drought curtailment when calculating the capacity of their supply systems, and that this policy would preclude Newport News from using IWR's drought curtailment scenario (as discussed above) to determine the 'official,' or rated capacity of their system. Although I have not relied on the drought curtailment scenario to justify my permit findings, I cannot ignore the reality that drought curtailment would be invoked if needed and would extend the capacity of Newport News' current system.

If Newport News Waterworks would use the existing reservoir storage volume of 5.5 mgd (at 25%), 8.9 mgd (at 20%) and 14.1 mgd (at 12%) in their calculation of safe yield, they would not need that same amount of safe yield from another future source, including additional storage space in a new reservoir. Utilizing as little as the 5.5 mgd of dead storage between 33% and 25% to calculate safe yield would reduce the risk of shortage to 1% by 2020, to less than 4% by 2030, to less than 8% by 2040, and to 13% by 2050. If Newport News Waterworks would utilize the 8.9 mgd of reservoir dead storage between 33% and 20% to calculate safe yield, there would be no risk of shortage by 2020, the risk of shortage would be reduced to less than 2% by 2030, to less than 4% by 2040, and to 8% by 2050. By using the 14.1 mgd of dead storage between 33% and 12% in their calculation of safe yield, there would be a less than 1% risk of shortage by 2030, a less than 2% shortage by 2040 and a less than 5% shortage by 2050. **Based on comments from the City of Newport News and others, I have modified my calculation of the safe yield benefit that could be realized from dead storage in the system which affects the projected availability of existing supplies.**

The basic conclusion of the IWR analysis have not been challenged and I maintain my determination that the RRWSG will have no risk of shortage through 2015 as stated in the RROD. However, I acknowledge that the safe yield benefit of utilizing dead storage would not be as great without increasing pumping from

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the Chickahominy River. A total of 5.2 mgd could be obtained from the existing system if the DEQ permit were modified to allow pumping to 61 mgd from the Chickahominy River (which may already be the existing capacity of the pump station). Considering the yield from all reservoirs and preserving the current 10 cfs flowby rule, the increases in safe yield compared to the base case for Chickahominy River pumping would be:

40 mgd, 33% dead storage (base case) = 0
 40 mgd limit, 25% dead storage = 1.6 mgd
 61 mgd limit, 25% dead storage = 5.2 + 1.6 mgd = 6.8 mgd

Utilizing the maximum capacity of the existing pump station and 25% dead storage, the risk of shortage would be postponed until 2020 with the additional 6.8 mgd of safe yield. The risk of shortage would be postponed even further (until 2022) with the 1.6 mgd minimum expected yield increase from the James City County desalination plant. These dates are estimated based on the highest expected need and lowest expected yield from groundwater, although both are very unlikely. Should demand not attain the maximum predicted levels or if groundwater wells provide more than the minimum expected, the need for additional water supply would be postponed ever further into the future. Furthermore, Newport News Waterworks will likely use drought curtailment during a drought as they have in the past and doing so would add a few more mgd to the yield of the system.

I also believe that the 1.6 to 6 mgd of water from James City County's proposed groundwater desalination plant should be considered as a reasonably foreseeable future water supply and taken into consideration in the region's water supply planning. I also believe that the RRWSG has underestimated the expected yield of the aquifer. Yield from the James City County desalination plant would postpone the need by a few additional years depending on how much of the potential 6 mgd yield is actually realized. In their comments on the RROD, the City of Newport News stated that James City County had applied for an increase in its groundwater permit from 4.6 to 6.2 mgd, and that this permit covered all extractions, fresh and saline, and thus will provide a net increase of only 1.6 mgd. I accept this argument to the extent that it replaces the lower bound of the 2 to 6 mgd estimate with 1.6 mgd.

Therefore, I have determined that the RRWSG will have no risk of shortage through the year 2015 with existing supplies. If water use is the highest expected, and if groundwater yields are the lowest expected, and if there is a recurrence of the worst drought of the twentieth century), there is a less than 4% risk of a maximum 11 mgd shortage by 2020. The entire 11 mgd shortage calculated for 2020 could be satisfied by using the existing reservoir storage volume and the yield from the James City County desalination plant, and the region would have only a very small risk of shortage by 2030. Each additional 5 mgd supply increment (from some other sources) significantly decreases the risk of future shortage. I find that the RRWSG would not need any new water supply, let alone a new reservoir until after about 2030.

I have modified my calculation of the safe yield benefit that could be realized from dead storage in the system which affects the projected availability of existing supplies. However, I have found nothing in Newport News' comments to change my basic conclusion that the RRWSG has no demonstrated need for additional water supply through 2015. This is primarily because the IWR assessment was conservative and there is almost no difference between the HDR and IWR assessments in the 2000-2020 period. I maintain that the RRWSG has at least 15 years before an additional water supply is needed. In that 15 years, the RRWSG can develop one or more environmentally acceptable options to meet future demand. The RRWSG also has readily available means (using 25% dead storage, the full existing pumping

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capacity from the Chickahominy with the existing flowby requirement, and the minimum contribution from the new James City County desalination plant) to extend the available water supply until at least 2022.

I acknowledge that it is reasonable for water supply planners to look many years into the future when designing new water supply sources, especially when reservoirs and pipelines can take a long time to construct. Determining the best time to begin construction on a new water project is a matter of judgment, involving consideration of risk of shortage, project costs, financial impacts, shortage costs, hardships to users and numerous uncertainties with respect to alternative strategies. The IWR panel suggested using Strategic Trigger Planning as their planning criterion to allow the RRWSG to make minimal investment for expansion and to determine when additional need warrants the next incremental investment.

Since there is no immediate risk of a shortage, and when it does occur, the risk of a shortage occurring would be so low, it is not reasonable to build such an environmentally damaging project to satisfy a need that may never materialize. It would be more prudent to accurately assess need, and plan ahead when appropriate to address that need. The RRWSG's need for additional water supply to eliminate all risk of shortage becomes more certain and more critical in about the year 2025. There are other alternative sources to meet any shortage when it occurs, either implemented incrementally or as a one-time project. In the event that Newport News will actually need more water sooner than IWR predicts, these same alternatives could be implemented at an earlier date. The risk to the environment, the risk to an entire watershed and the risk to the continued way of life of Native Americans in the Pamunkey Neck area, especially the Mattaponi Tribe, are too great when weighed against the unjustified need based on my interpretation of the IWR panel's report.

The RRWSG has not demonstrated a sufficient need at this time for additional water supply and has not demonstrated that the proposed King William Reservoir would be the only alternative to meet that need when it does occur. Based on the results of the IWR report, there does not appear to be a persuasively demonstrated need for the destruction of 437 acres of wetlands/shallow open water habitat and the functions they perform as well as the loss of this ecosystem in order to meet this very small deficit in the region's future water demands. Furthermore, the proposed mitigation plan cannot adequately replace the wetland functions, contiguous habitat and wetland types that would be impacted by the project. The productive and diverse wetland system of the Cohoke Creek valley is a valuable public resource that should not be destroyed without an overriding public need. Wetland losses must first be avoided, then minimized and finally unavoidable wetland losses must be mitigated. While mitigation for wetland losses must be planned and considered in the evaluation of a permit application, whether adequate compensation can be accomplished is not a consideration in determining if the proposed project represents the least environmentally damaging practicable alternative. If there is no demonstrated need for the loss, then the loss is avoidable and no amount of wetland mitigation can compensate for the loss.

Other practicable alternatives (as discussed in Sections 7 and 10) are available to the City of Newport News to reduce their risk of shortage when the need does occur (groundwater, desalination, use of dead storage below 33%, drought curtailment, etc.). Also, the potential exists to further reduce the RRWSG's projected need by adopting water conservation incentives and by encouraging non-potable reuse of wastewater. New and constantly improving technologies are making other water supply options as feasible and cost effective as reservoirs have traditionally been. Therefore, I find that it is inappropriate

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to assume that only the proposed King William Reservoir has the potential to meet the applicant's future water supply needs.

23. District's Recommendation: I have determined that the decision on this project is a major federal action significantly affecting the quality of the human environment and I have evaluated, in light of the total public interest, all available information pertaining to the subject application. This determination is based on full consideration of information contained in my Draft, Supplemental and Final Environmental Impact Statements, and comments received from federal, state and local agencies and the general public as well as all subsequent information provided by the applicant. My recommended decision reflects the national concern for both protection and utilization of important resources and is based on an evaluation of the probable impacts, including cumulative impacts, of the proposed activity and its intended use on the public interest. The benefits, which may reasonably be expected to accrue from the proposal, were balanced against its reasonably foreseeable detriments (33 CFR 320.4 (a)). This review required an evaluation of the project under NEPA, and for consistency with the 404(b)(1) Guidelines. The 404(b)(1) Guidelines require an evaluation of all primary and secondary impacts of a project on the aquatic environment (40 CFR 230.11(h)); and NEPA requires an evaluation of all direct, indirect and cumulative effects of a project on the environment (40 CFR 1508.8).

The Corps regulations at 33 CFR 320.4(j)(4) state: "In the absence of overriding national factors of the public interest that may be revealed during the evaluation of the permit application, a permit will generally be issued following receipt of a favorable state determination, provided the concerns, policies, goals and requirements as expressed in 33 CFR Parts 320-324, and the applicable statutes have been considered and followed: e.g., the National Environmental Policy Act; the Fish and Wildlife Coordination Act; the Historical and Archaeological Preservation Act; the National Historic Preservation Act, the Endangered Species Act, the Coastal Zone Management Act, the Marine Protection, Research and Sanctuaries Act of 1972, as amended, the Clean Water Act, the Archaeological Resources Act and the American Indian Religious Freedom Act."

The Commonwealth of Virginia has issued a Virginia Water Protection Permit/401 Water Quality Certification for the King William Reservoir and the Governor of Virginia has urged me to issue a permit as well. **It should be noted that the Virginia Water Protection Permit /401 Certification has been challenged in court by the Mattaponi Tribe and several environmental groups. The Virginia Supreme Court decided on 2 March 2001 that these parties have standing to bring their claims in court, reversing an earlier Newport News Circuit Court decision, and the case has been remanded for full trial on the merits by lower court. Therefore, the status of the VWPP/401 Certificate remains uncertain.** I have determined that the concerns, policies, goals and requirements of several of these listed statutes would not be met if a Department of the Army Permit were issued for this project. It should be noted that many of the review factors considered by the Corps of Engineers are not the same as those considered by the state; therefore the outcome of federal and state reviews can be quite different. In addition to evaluating the project in light of all applicable federal laws and regulations, I must conduct a public interest review and alternatives analysis that balance the need for the project against its adverse environmental impacts.

In accordance with 33 CFR 320.4(b)(4), "No permit will be granted which involves the alteration of wetlands identified as important by paragraph (b)(2) of this section or because of provisions of paragraph (b)(3) of this section unless the district engineer concludes, on the basis of the analysis required in paragraph (a) of this section that the benefits of the proposed alteration outweigh the damage to the wetlands resource." The wetlands in the Cohoke Creek valley perform many of the functions considered

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important to the public interest listed in 33 CFR 320.4 (b)(2) and have been identified by the EPA and the U. S. Fish and Wildlife Service to be an Aquatic Resources of National Importance (ARNI). The remaining wetlands in the Cohoke Creek valley downstream of the proposed dam would continue to perform some of these functions, but to a lesser extent, since they would be impacted by decreased stream flows, sediment deprivation, severed detrital link between the headwaters and downstream reaches, and increased loading rates of dissolved nutrients within the reservoir pool area. Also, these wetlands would be under threat of destruction from future expansion of the reservoir to the applicant's preferred dam location at KWR-II.

In accordance with the Environmental Protection Agency's Section 404(b)(1) Guidelines, "Except as provided under Section 404 (b)(2), no discharges of dredged or fill material shall be permitted which will cause or contribute to significant degradation of the waters of the United States." (40 CFR 230.10(c)); and "...no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequence" (40 CFR 230.10 (a)). The proposed King William Reservoir project would cause or contribute to significant degradation of waters of the U.S. and other practicable alternatives are available to meet the applicant's need for additional water supply when it arises. Therefore, the individual and cumulative damages to the wetland resource outweigh the benefits of the proposed filling to the applicant.

While the cost to the environment of providing more water than the RRWSG needs at this time are too high, it is reasonable and appropriate for me to consider what would happen if the risk of shortage is as great as reported by the RRWSG. I acknowledge that the costs to the RRWSG of providing too little water are also high. As stated in 33 CFR 320.4 (m), "Water is an essential resource, basic to human survival, economic growth and the natural environment." However, this section goes on to state, "Water conservation requires the efficient use of water resources in all actions which involve the significant use of water or that significantly affect the availability of water for alternative uses including opportunities to reduce demand and improve efficiency in order to minimize new supply requirements." If deficits were to develop more quickly than I anticipate, one or more of the incremental alternatives discussed in Sections 7 and 10 (groundwater, desalination, use of dead storage below 33%, drought curtailment, etc.). could be called upon to solve this problem more quickly and less expensively than the proposed King William Reservoir. Indeed, I find this to be both the environmentally preferred alternative (under NEPA) and the least environmentally damaging, practicable alternative (under the 404(b)(1) Guidelines), because of its inherent flexibility and its low environmental costs.

The applicant has not demonstrated a sufficient need for the project and I have determined that other less environmentally damaging practicable alternatives to the proposed King William Reservoir are available to the applicant to meet their actual need, when it does occur. I have found that the issuance of a permit for the destruction of 437 acres of ecologically significant wetland/open water habitat would neither be the environmentally preferred alternative, nor would it be the least environmentally damaging practicable alternative. I concur with EPA, the U.S. Fish and Wildlife Service and others regarding the anticipated environmental losses; and I agree that not all of these losses could be fully mitigated. I have weighed the actual need against the direct and indirect environmental consequences of the proposed project, and I have determined that the adverse impacts would not be justified.

I find that the King William Reservoir project has the potential to result in significant direct, indirect, and cumulative effects as defined by NEPA, and in significant primary and secondary effects as defined by

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EPA's 404 (b)(1) Guidelines. I have determined that both individually and cumulatively, the proposed discharge would cause or contribute to significant degradation of the waters of the United States. I have determined that the issuance of a permit would be contrary to the public interest because of the unnecessary loss of wetlands and the potential for significant environmental degradation; and I find that the proposed discharge of fill material does not comply with the Environmental Protection Agency's 404 (b)(1) Guidelines. Therefore, my decision is to recommend to the Commander of the North Atlantic Division that the application for the proposed King William Reservoir be denied.

Norfolk District's Final Recommendation: I have reviewed all information submitted by the applicant, state and federal agencies, state, federal and local officials, environmental groups and the general public in response to my RROD that was published on 20 March 2001. Throughout the final document, I have addressed all substantive comments. Some of the comments and information submitted have altered my analysis and I have made changes to the text of the Final RROD where appropriate. However, the majority of the comments from the applicant, their consultants and the state agencies are reiterations of previous comments submitted by the applicant. Some comments reflect misrepresentations and misinterpretations of statements contained in the RROD as well as information taken out of context.

The City of Newport News and others indicated that I should have considered the restrictions imposed by the conditions of the VWPP in my evaluation of the environmental impacts of the RRWSG's permit application. As stated elsewhere, I am evaluating the permit application that is before me. If the City of Newport News were to modify their permit application so as to propose the restrictions that the current VWPP requires, I would consider that modified application to constitute the permit application that is before me. They have not done so. To the contrary, the City of Newport News has made it clear they do not endorse the VWPP conditions and they have stated their intent to seek changes to those conditions at the earliest opportunity. Were I to issue this permit, I would incorporate the VWPP conditions, or more restrictive conditions as necessary, into the Corps permit since I believe they are not only appropriate, but also necessary. This would ensure that those conditions would remain in force through the Corps permit even if the City of Newport News succeeded in having them removed from the VWPP. Indeed, if including these conditions into the Corps permit were all that was needed to make this project conform to the 404 (b)(1) Guidelines, and to no longer be contrary to the overall public interest, I would do so and proceed with issuing the permit. Since that is not the case, and since the City of Newport News has not modified their permit application with regard to these conditions, I am left with evaluating the permit application that is before me. Similarly, the City of Newport News' eighth version of their mitigation plan (the "Final Mitigation Plan"), is their current proposal, so it is the one that is evaluated in this document; I am not basing my decision on any of the versions that preceded it, nor will I base it on future additions which the City of Newport News has indicated might later be submitted.

Governor Gilmore's letter supporting the King William Reservoir included the Commonwealth of Virginia's "Public Interest Review" of the project. However, what Governor Gilmore has submitted is actually a critique of portions of the RROD. It appears that the state has taken the City of Newport News' claims at face value with little or no independent or critical review. I do not consider this to be an independent public interest review or an independent evaluation of the effects of the project. If any such independent review has been conducted, it has not been provided to the Norfolk District. Governor Gilmore stated his belief that my views in the RROD are unsubstantiated. However, in his critique of the RROD, he has presented only unsupported and unsubstantiated claims as evidence that the King William Reservoir project is needed, and would not impact the environment or the minority Indian tribes.

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I maintain my determination that the RRWSG will have no risk of shortage through 2015 at the very earliest. However, I acknowledge that the additional safe yield benefit of utilizing dead storage would not be as great without increasing pumping from the Chickahominy River. Considering the yield from all reservoirs and preserving the current 10 cfs flowby rule, the increases in safe yield compared to the base case for Chickahominy River pumping would be between 1.6 and 6.8 mgd and the risk of shortage could be postponed at least until 2020. The risk of shortage would be postponed even further (to at least 2022) with the 1.6 mgd minimum expected yield increase from the James City County desalination plant.

This is based on the assumption that the greatest forecasted demand in each demand category would occur simultaneously, including the full military demand for 3 mgd, and the demand would not be reduced during drought by response measures in use today. This maximum demand was coupled with the lowest expected groundwater yield, although that combination of events is very unlikely. For comparison, at the other end of the spectrum are circumstances based on the least forecasted water use and the greatest expected groundwater yield, taking the need for a new water supply to 2043, but that combination of events is equally unlikely. Uncertainty regarding these factors obviously plays a dramatic role in how long the existing water supplies will last, and because the extremes are so improbable, the date when additional water supplies are needed will almost certainly be much later than 2015 and much earlier than 2043. Nonetheless, the IWR conclusion is based on the most conservative combination of demands and groundwater yields and thus provides an extremely conservative estimate of the amount of time available to secure acceptable supply measures.

The ultimate conclusion of the IWR study is that the RRWSG has at least 15 years before an additional water supply is needed. In that 15 years, the RRWSG can develop one or more environmentally acceptable options to meet future demand. The RRWSG also has readily available means (using 25% dead storage, the full existing pumping capacity from the Chickahominy with the existing flowby requirement, and the minimum contribution from the new James City County desalination plant) to extend the available water supply until at least 2022. The RRWSG's need for additional water supply is neither immediate nor certain, whereas majority of the environmental and cultural impacts of the proposed King William Reservoir project would be both immediate and certain.

In summary, I have been presented with no evidence or argument that would cause me to change my original recommendation of denial for the King William Reservoir Project. Therefore, I hereby incorporate into my final recommendation of denial my previous findings in this section along with the changes specifically noted.

2 July 2001
Date


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